Installation and service instructions

for heating engineers

Vitocal 300
type AW, BW and WW

See notes on applicability, page 3.

VITOCAL 300

Vitocal 300, type AW

Vitocal 300, type BW and WW

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Please keep safe

Safety instructions

Please follow these safety instructions closely to prevent accidents and material losses.

Safety regulations
Installation, initial start-up, inspection, maintenance and repairs must only be carried out by a competent person (heating engineer/refrigeration specialist/ installation contractor).

Please observe all relevant safety requirements.
See also the red safety instructions sheet in the Vitotec technical documentation folder.

Before working on the equipment/ heating system, isolate the mains electrical supply (e.g. by removing a separate mains fuse or by means of a mains electrical isolator) and safeguard against unauthorised re-connection.
Disconnect the mains electrical supply by means of an isolating device which simultaneously isolates all non-earthed conductors with at least 3 mm contact separation.

External voltages may still be present if the electricity supply company causes a power failure.
Drilling work requires a permit from your local water authority. When drilling deeper than 100 m you may require the permission of your local mining authority. Register the heat pump with your local electricity supply company.

Repairs
It is not permitted to carry out repairs on parts that fulfil a safety function. Use only original Viessmann spare parts, or equivalent parts that have been approved by Viessmann.

Initial start-up
This must be carried out by the system installer or a commissioning engineer designated by him; all actual values should be recorded in a commissioning/service report.

Instructing the system user
The system installer must hand the operating instructions to the system user and instruct him/her in the operation of the system.

⚠ ***Safety instructions***
In this instruction manual, this heading denotes information which must be observed to prevent accidents and material losses.

This symbol is a reference to other instructions which must be observed.

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Applicability

Applicable for the following heat pumps:

Air/water heat pump
Vitocal 300, type AW106, AW108, AW110, AW113, AW116,
5.4 to 14.8 kW
from serial no. 3004 313 00101
3004 314 00101
3004 315 00101
3004 316 00101
3004 317 00101

Brine/water heat pump or water/water heat pump
Vitocal 300, type BW104, BW106, BW108, BW110, BW113, BW116, BW208, BW212, BW216, BW220, BW226, BW232,
4.8 to 32.6 kW
and
type WW104, WW106, WW108, WW110, WW113, WW116, WW208, WW212, WW216, WW220, WW226, WW232,
6.3 to 43.0 kW
from serial no. 3004 301 00101
3004 302 00101
3004 303 00101
3004 304 00101
3004 305 00101
3004 306 00101
3004 307 00101
3004 308 00101
3004 309 00101
3004 310 00101
3004 311 00101
3004 312 00101

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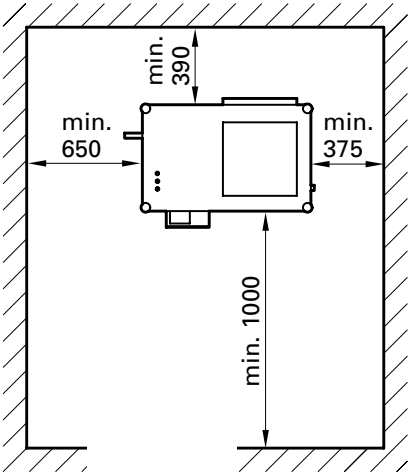
Positioning

Wall clearances (viewed from above)

Type AW

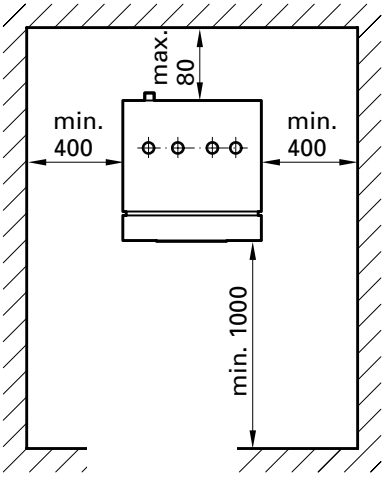


The installation location must be kept free from frost and must be able to be adequately ventilated.

The thermal insulation of cold components should be improved in accordance with standard practice to prevent condensation.

Type AW:
Place the heat pump horizontally on the anti-vibration supports supplied.

Type BW and WW



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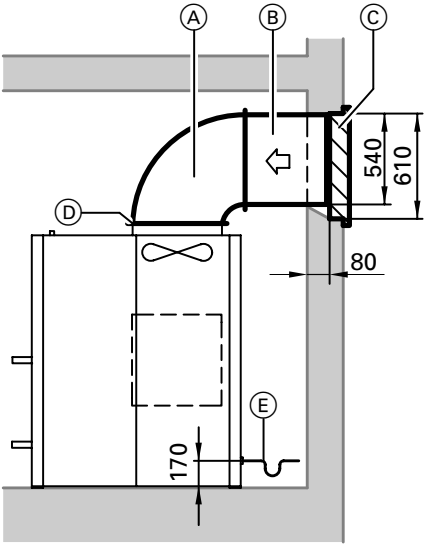
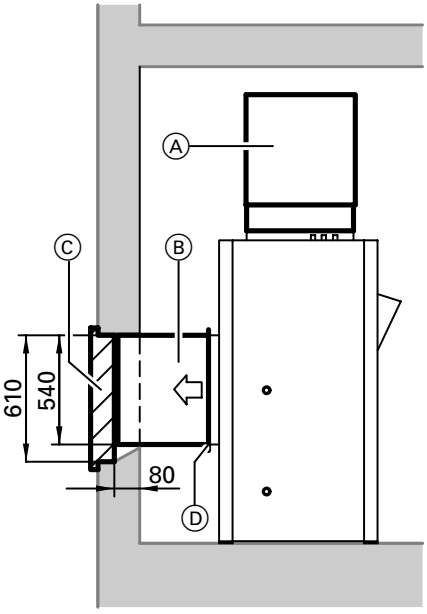
Type AW

Front view



Ⓐ Air duct, bend 90°
Ⓑ Air duct, straight
Ⓒ Weather grille
Ⓓ Flexible adaptor
Ⓔ Condensate drain, External ∅ 22 mm

Side view l.h.



Ⓐ Ventilation duct
Ⓑ Exhaust air duct with ventilation duct, straight
Ⓒ Weather grille
Ⓓ Flexible adaptor

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Type AW (cont.)

1. Route all ducts, adaptors, bends, etc. for ventilation and exhaust air from the outside to the heat pump and make all necessary connections.
   Please note:
   Avoid short circuiting between the air inlet and outlet.
   Install ducts without stresses and strains.

2. Centre the air ducts in the wall aperture and insulate against thermal or sound transmission.

3. Seal all ducts adequately.

4. Close the exhaust and ventilation air ducts to the outside with a weather grille (mesh width approx. 5 mm).

5. Lead the condensate drain from the heat pump using a siphon (hydraulic seal at least 60 mm) (Dia.).

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type AW	1	see type plate
	Air duct, bends, adaptors	subject to requirements	see type plate
	Weather protection grille	subject to requirements	9532 661

Type BW and WW

- When installing the circulating pump for the brine circuit (suitable for cold water), position the electrical connection in the 12 o'clock position (this prevents an ingress of condensate).

- To ensure perfect operation, route brine circuit pipes so that no air pockets can form and complete ventilation is ensured.

- Equip brine circuit acc. to DIN 4757 with expansion vessel and safety valve.

- As an expansion vessel, use only a suitable diaphragm expansion vessel.

- The expansion vessel must be approved in accordance with DIN 4807.
  The diaphragms and seals of the expansion vessel and the safety valve must be suitable for the heat transfer medium.
  To calculate the inlet pressure of the diaphragm expansion vessel:

  Technical guide for heat pumps

- Ensure adequate thermal and sound insulation of all pipes routed through wall apertures.

- Thermally insulate pipes on the primary side inside buildings and provide with a vapour seal.
- Fill the brine circuit with Viessmann thermal transfer medium "Tyfocor" (Ethylene glycol water mixture with anti-freeze protection to –15 °C).
  The blow-off and drain pipes should terminate in a container capable of holding the max. expansion vessel volume.

- The components used must be resistant to the "Tyfocor" heat transfer medium.

- Brine/water heat pump:
  Install a jumper between terminals 5 and 6 (in the top of the control panel).

- Water/water heat pump with/without intermediate circuit:
  Connect a flow switch between terminals 5 and 6.
  Do not install a jumper (possible frost damage to the heat pump).

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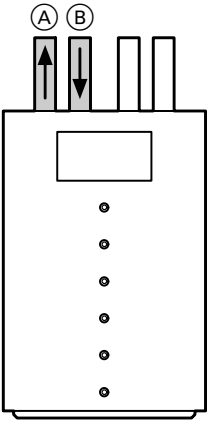
Type BW and WW (cont.)



1. Route and connect the heat pump flow and return pipes.

2. Flush pipework and check for leaks.

3. Fill the brine circuit with heat transfer medium "Tyfocor" and vent.
   Operating pressure: 2 bar
   Max. permissible operating pressure: 4 bar

4. Insulate pipes with vapour barriers.

Ⓐ Primary return (brine or groundwater)
Ⓑ Primary flow (brine or groundwater)

Type BW/WW	104	106	108	110	113	116	208	212	216	220	226	232
Primary flow and return R	1″	1″	1″	1¼″	1¼″	1¼″	1″	1″	1¼″	1¼″	1½″	1½″

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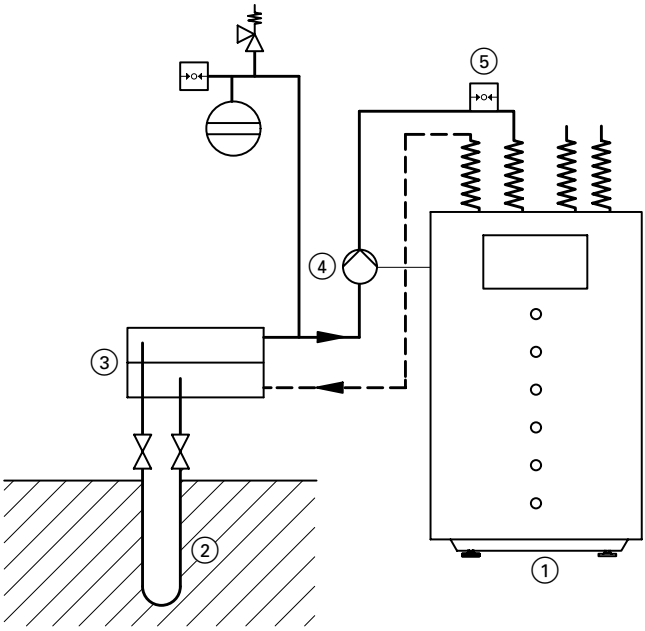
Type BW

Brine/water heat pump – ground probe version



Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type BW	1	see type plate
②	Ground probe	min. 1	on site
③	Brine manifold for ground probes	1	7143 762
④	Brine accessory pack incl. 2 ball shut-off valves, expansion vessel, air separator, pressure gauge, safety valve (2.5 bar) and primary pump	1	
	■ Rated output up to 14.0 kW: Wilo TOP S30/7 and expansion vessel (18 litres)		Z000 646
	■ Rated output up to 16.3 kW: Wilo TOP S30/7 and expansion vessel (40 litres)		Z000 647
	■ Rated output up to 32.6 kW: Wilo TOP S 30/10 and expansion vessel (40 litres)		Z000 648
⑤	Brine pressure switch (option)	1	9532 663

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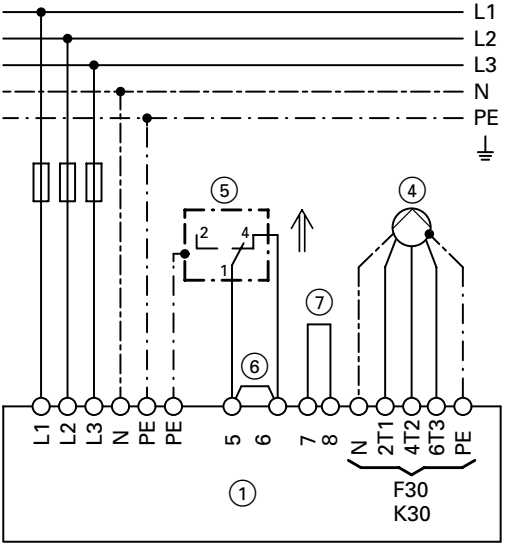
Type BW (cont.)

Connection diagram



⑥ Install jumper, if no brine pressure switch is installed

⑦ Optional connection conversion kit EVU shutdown, part no. 7162 386

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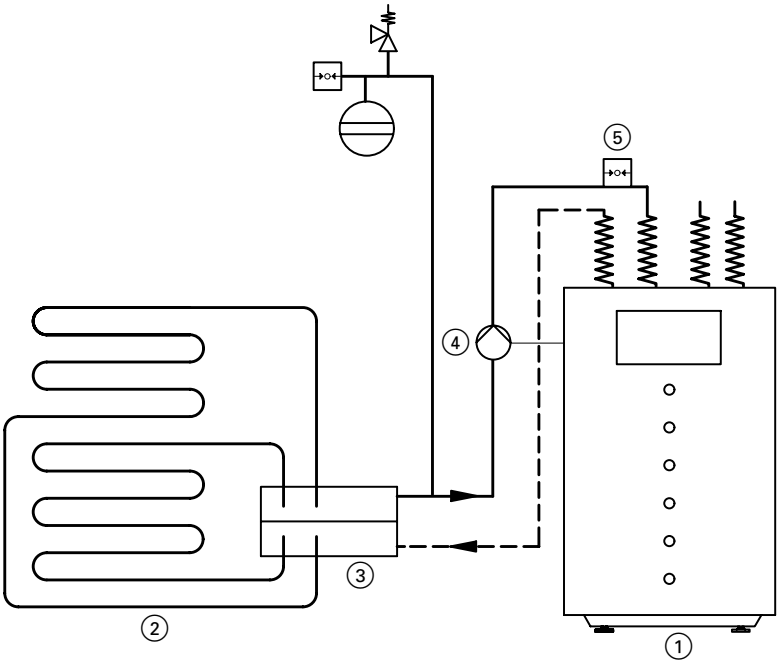
Type BW (cont.)

Brine/water heat pump – ground probe version



Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type BW	1	see type plate
②	Ground probe	min. 1	on site
③	Brine manifold for ground collectors	1	7143 763
④	Brine accessory pack incl. 2 ball shut-off valves, expansion vessel, air separator, pressure gauge, safety valve (2.5 bar) and primary pump	1	
	■ Rated output up to 14.0 kW: Wilo TOP S30/7 and expansion vessel (18 litres)		Z000 646
	■ Rated output up to 16.3 kW: Wilo TOP S30/7 and expansion vessel (40 litres)		Z000 647
	■ Rated output up to 32.6 kW: Wilo TOP S 30/10 and expansion vessel (40 litres)		Z000 648
⑤	Brine pressure switch (option)	1	9532 663

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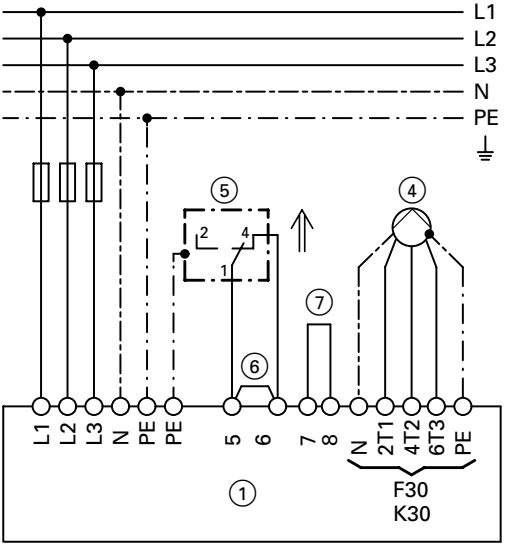
Type BW (cont.)

Connection diagram



⑥ Install jumper, if no brine pressure switch is installed

⑦ Optional connection conversion kit EVU shutdown, part no. 7162 386

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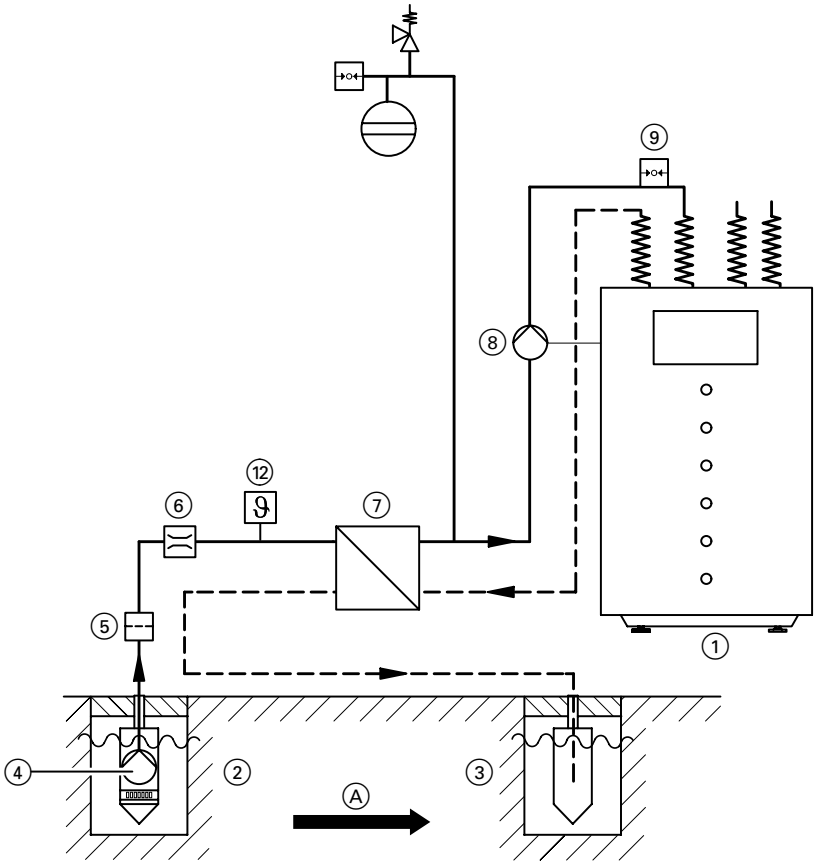
Type WW

Water/water heat pump – ground probe version



Ⓐ Groundwater flow direction

Type WW (cont.)

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type WW = type BW plus conversion kit (incl. frost protection thermostat ⑩ and ⑪, one each for every stage, and flow switch ⑫)	1	see type plate
②	Delivery well	subj. to require-ments	on site
③	Return well	subj. to require-ments	on site
④	Primary pump (groundwater delivery well)	subj. to require-ments	on site
⑤	Dirt trap	1	on site
⑥	Volume choke	1	on site
⑦	Intermediate circuit heat exchanger	1	see type plate
⑧	Brine accessory pack incl. 2 ball shut-off valves, expansion vessel, air separator, pressure gauge, safety valve (2.5 bar) and intermediate circuit pump	1	
	■ Rated output up to 14.0 kW: Wilo TOP S30/7 and expansion vessel (18 litres)		Z000 646
	■ Rated output up to 16.3 kW: Wilo TOP S30/7 and expansion vessel (40 litres)		Z000 647
	■ Rated output up to 32.6 kW: Wilo TOP S30/10 and expansion vessel (40 litres)		Z000 648
⑨	Brine pressure switch for intermediate circuit (option)	1	9532 663

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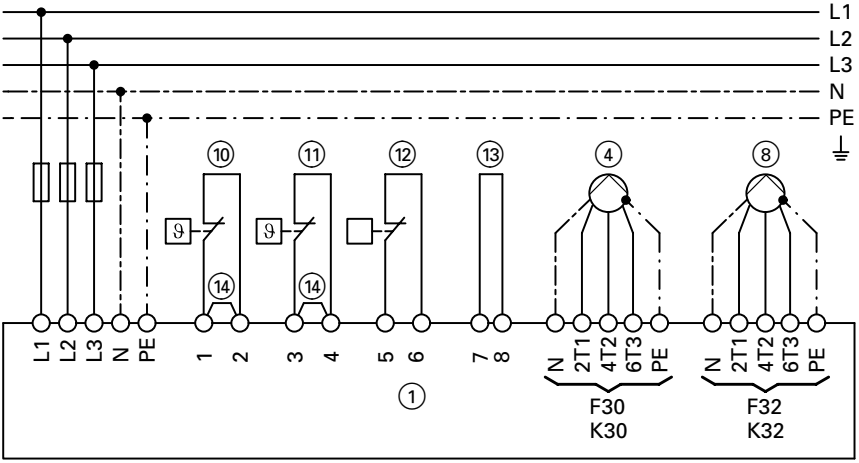
Type WW (cont.)

Connection diagram



⑩, ⑪ Frost protection thermostat
⑫ Flow switch
⑬ Optional connection conversion kit EVU shutdown, part no. 7162 386
⑭ Remove jumper when making this connection

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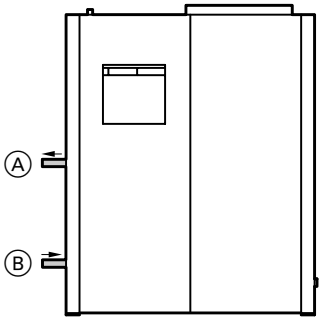
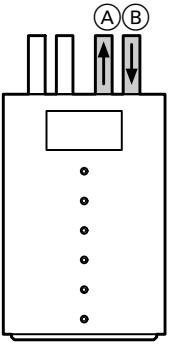
System versions



Blocking
The blocking of the heat pump supply by your electricity supplier (EVU) must be affected via the zero-volt contact. The heat pump operation will be impaired if the mains supply is completely cut off. In this connection, the EVU shutdown conversion kit (accessory) can be used, which keeps the system operational via an additional control phase using the buffer storage unit and secondary pumps.



Direct heating water heater and immersion heater element
Safeguard both devices via separate connections.
The heat pump CD 60 heat pump control unit switches the contactor.

Ⓐ Heating water flow, R1″
Ⓑ Heating water return, R1″

1. Thoroughly flush the heating system (particularly when connecting to an existing system), and connect the flow and return pipes.

2. Carry out a leak test.
   Operating pressure: 2 bar
   Maximum permissible operating pressure: 4 bar

Five standard and five dual operation application examples for the installation of a heat pump system are listed below.
The heating system installation also applies to Viessmann heat pumps Vitocal 300, type WW (comprising type BW plus conversion kit) and type AW, giving due consideration to type-specific features.

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System version 1

Modulating system – mono-energetic operation

System definition

- Type AW: 101
- Type BW and WW
  - single stage: 1
  - two stage: 51

Primary circuit of the heat pump
If the actual temperature measured by the return temperature sensor (in the heating circuit) of heat pump ① is lower than that set at the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ② start to operate.

Secondary circuit of the heat pump
Heat pump ① supplies heat to the heating circuit.
The CD 60 control unit integrated into heat pump ① controls the heating water flow temperature and therefore the heating circuit.
Secondary pump ② channels the heating water via three-way change-over valve ③ either to DHW cylinder ④ or to the heating circuit.

Where necessary, the flow temperature can be raised with direct heating water heater ⑤ (accessory, e. g. appropriate with air/water heat pumps). Direct heating water heater ⑤ supplements the heating load during peak times at low outside temperatures.
The flow rate within the heating circuit is regulated by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor.

Provide a bypass (overflow valve) ⑥ at the end of the final heating run to ensure the constant flow through the heat pump circuit.
Heat pump ①, primary pump and the intermediate circuit pump are switched off, if the actual return temperature at the return temperature sensor is higher than the value set in the CD 60 control unit.

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System version 1 (cont.)

Domestic hot water heating with the heat pump

In the "as delivered condition", DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during cheap tariff times, i.e. during the night.

Heating demand is communicated via DHW cylinder temperature sensor ⑦ and the CD 60 control unit, which regulates three-way changeover valve ③. The heat pump raises the flow temperature to the value required for DHW heating.

The DHW can be further heated by an electric supplementary heating system ⑧ (e. g. immersion heater element EHO).

The CD 60 control unit switches the heating water flow to the heating circuit using three-way changeover valve ③, if the actual value measured at DHW temperature sensor ⑦ is higher than that set at the CD 60 control unit.

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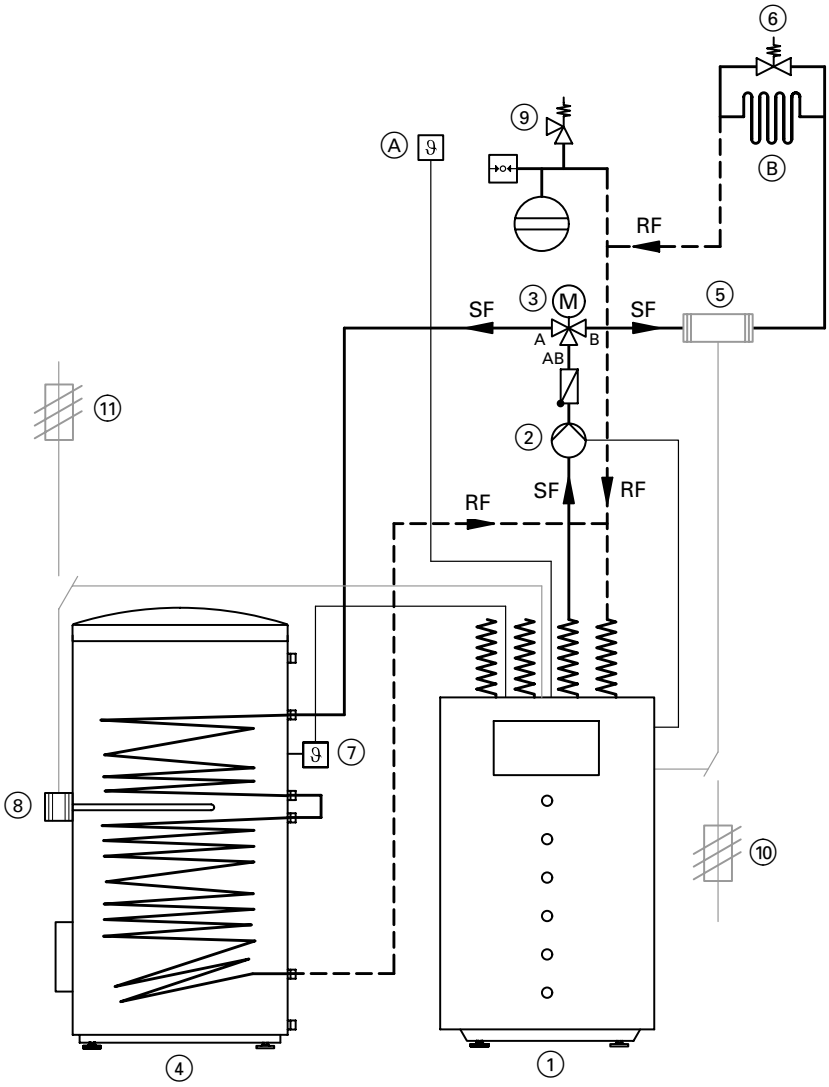
System version 1 (cont.)



Ⓐ Outside temperature sensor
Ⓑ Underfloor heating circuit

VL Flow
RL Return

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System version 1 (cont.)

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type AW, BW and WW	1	see type plate
②	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
③	Three-way changeover valve Central heating/DHW heating ■ up to 18.5 kW rated output ■ from 18.5 kW rated output	1	 7814 924 7165 482
④	Domestic hot water cylinder ■ Vitocell-B 100, type CVB (300 or 500 litres capacity) ■ Vitocell-B 300, type EVB (350 or 500 litres capacity)	1	see type plate
⑤	Direct heating water heater ■ 3 kW ■ 6 kW	1	 9532 654 7143 761
⑥	Overflow valve	1	on site
⑦	Cylinder temperature sensor for measuring the DHW temperature	1	7159 671
⑧	Electrical supplementary heating system ■ Immersion heater element EHO*1 ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 7265 198 on site
⑨	Safety equipment block (equipped)	1	7143 779
⑩	Contactor relay for activating the direct DHW heater	1	7814 681
⑪	Contactor relay for activating the immersion heater element	1	7814 681

*1 *Only in conjunction with Vitocell-B 100.*

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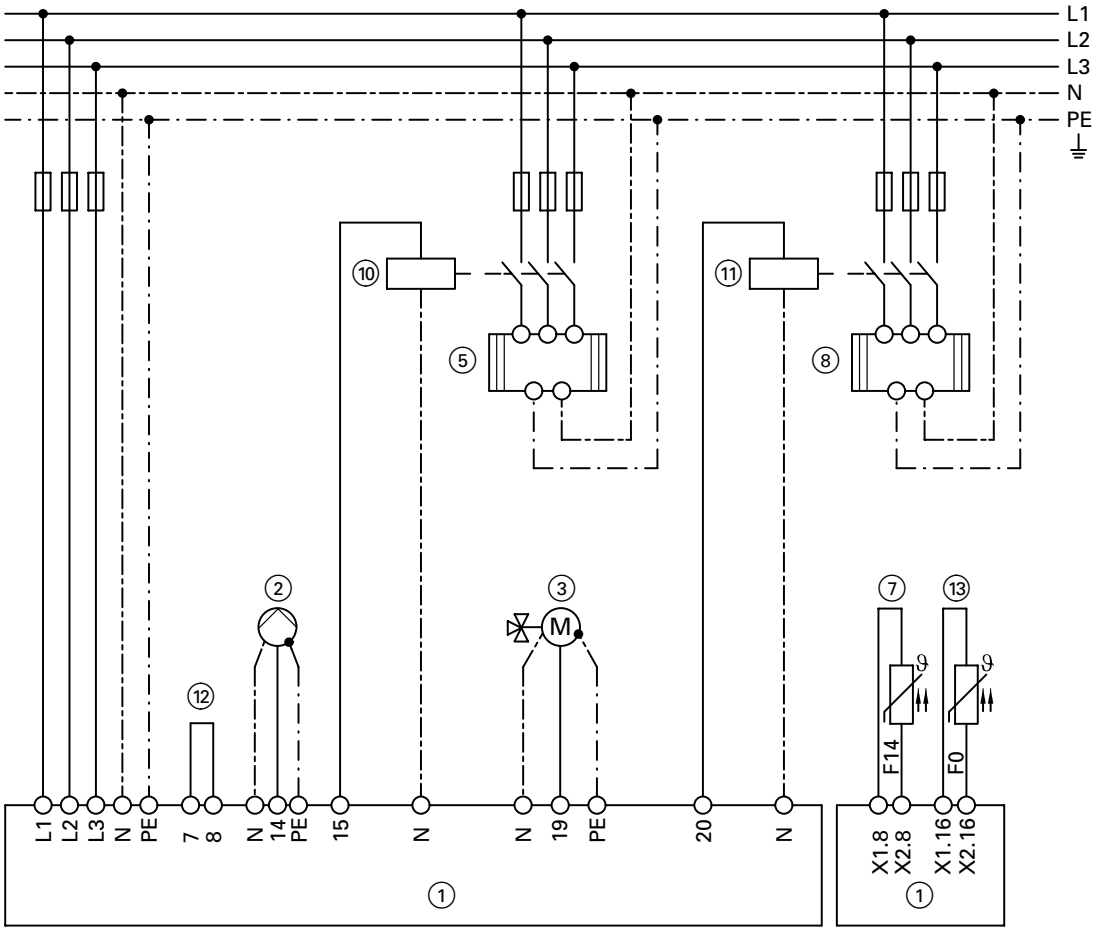
System version 1 (cont.)

Connection diagram



⑫ Optional connection conversion kit EVU shutdown, part no. 7162 386
⑬ Outside temperature sensor

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System version 2

Mono operation with de-coupled modulating storage unit

System definition

- Type AW: 111
- Type BW and WW
  - single stage: 11
  - two stage: 61

Primary circuit of the heat pump
If the actual temperature measured by upper temperature sensor ② of heating water buffer storage unit ③ is lower than that set at the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ④ start to operate.

Secondary circuit of the heat pump
Heat pump ① supplies heat to the heating circuit.
The CD 60 control unit integrated into heat pump ① controls the heating water flow temperature and therefore the heating circuit.
Secondary pump ④ channels the heating water via three-way changeover valve ⑤, either to DHW cylinder ⑥ or to heating water buffer storage unit ③ or into the heating circuit. Heating circuit pump ⑦ channels the required water volume into the heating circuit.
The flow rate within the heating circuit is regulated by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor. Also, it can vary from that of heat pump circuit (secondary pump ④) through sizing heating circuit pump ⑦. Install a heating water buffer storage unit ③ parallel to the heating circuit, in order to compensate for the differences between these water volumes. Heat that is not required by the heating circuit is stored in parallel in heating water buffer storage unit ③. In addition, this provides a balanced heat pump operation (longer operating times).
Heat pump ① is switched off again, when the actual temperature measured by temperature sensor ⑧ of heating water buffer storage unit ③ has reached the temperature set at the CD 60 control unit. The heating circuit will then be supplied by heating water buffer storage unit ③. Only when the temperature at upper temperature sensor ② of heating water buffer storage unit ③ falls below the set value will heat pump ① be switched on again. The heating circuit will be supplied with heat by heating water buffer storage unit ③ in case the electricity supplier shuts down the heat pump.

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System version 2 (cont.)

Domestic hot water heating with the heat pump

In the "as delivered condition", DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during cheap tariff times, i.e. during the night.

Heating demand is communicated via DHW cylinder temperature sensor ⑨ and the CD 60 control unit, which regulates three-way changeover valve ⑤.

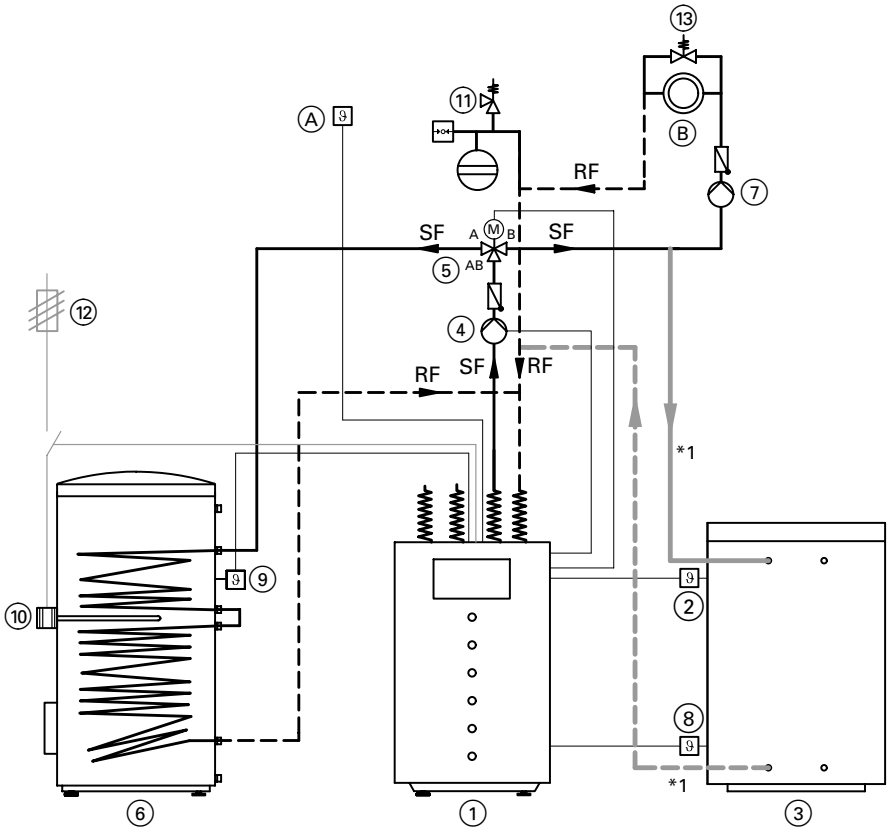
The heat pump raises the flow temperature to the value required for DHW heating.

The DHW can be further heated by an electric supplementary heating system ⑩ (e.g. immersion heater element EHO).

The CD 60 control unit switches the heating water flow to the heating circuit using three-way changeover valve ⑤, if the actual value measured at DHW temperature sensor ⑨ is higher than that set at the CD 60 control unit.

5862 241 GB

System version 2 (cont.)



Ⓐ Outside temperature sensor
Ⓑ Underfloor heating circuit
VL Flow
RL Return

[1]At least one size up (DN) from the remaining pipework.

5862 241 GB

System version 2 (cont.)

Required equipment

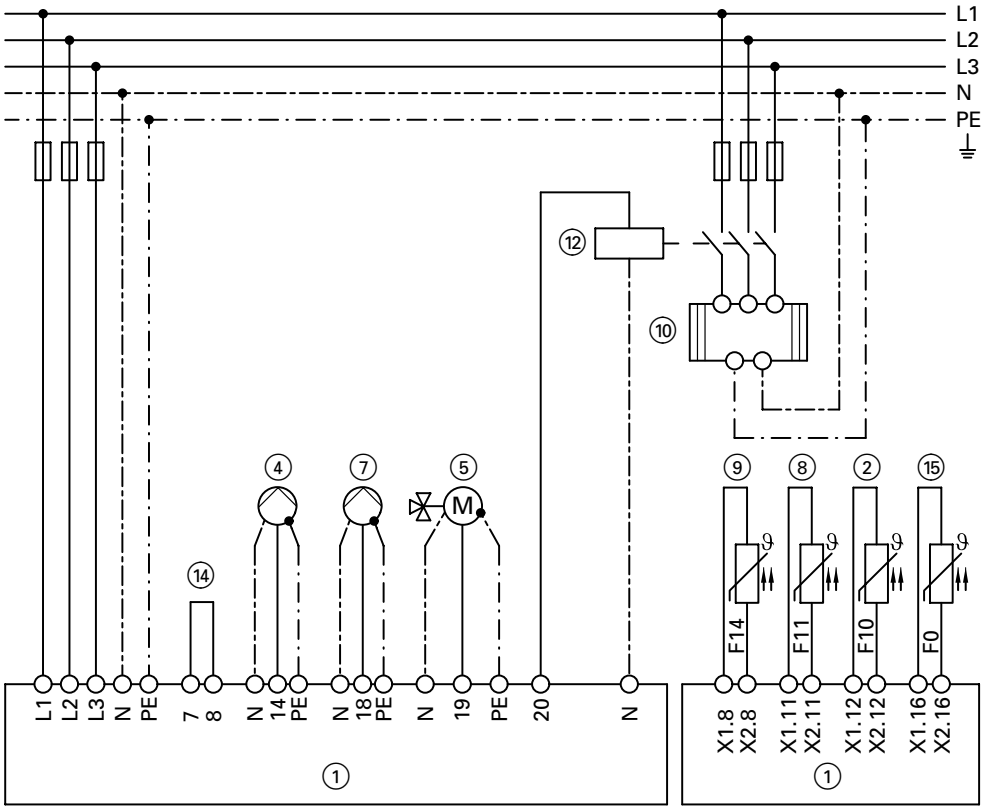
Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type AW, BW and WW	1	see type plate
②	Temperature sensor to establish the temperature within the heating water buffer storage unit (top)	1	7159 671
③	Heating water buffer storage unit Vitocell 050, type SVP (600 or 900 litres capacity)	1	see type plate
④	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑤	Three-way changeover valve Central heating/DHW heating ■ up to 18.5 kW rated output ■ from 18.5 kW rated output	1	 7814 924 7165 482
⑥	Domestic hot water cylinder ■ Vitocell-B 100, type CVB (300 or 500 litres capacity) ■ Vitocell-B 300, type EVB (350 or 500 litres capacity)	1	see type plate
⑦	Heating circuit pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑧	Temperature sensor to establish the temperature within the heating water buffer storage unit (bottom)	1	7159 671
⑨	Cylinder temperature sensor for measuring the DHW temperature	1	7159 671
⑩	Electrical supplementary heating system ■ Immersion heater element EHO*1 ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 7265 198 on site
⑪	Safety equipment block (equipped)	1	7143 779
⑫	Contactor relay for activating the immersion heater element	1	7814 681
⑬	Overflow valve	1	on site

*1 *Only in conjunction with Vitocell-B 100.*

5862 241 GB

System version 2 (cont.)

Connection diagram



⑭ Optional connection conversion kit EVU shutdown, part no. 7162 386
⑮ Outside temperature sensor

System version 3

Mono operation with heating water buffer storage unit

System definition

- Type AW: 127
- type BW and WW
  - single stage: 27
  - two stage: 77

Primary circuit of the heat pump
If the actual temperature measured by upper temperature sensor ② of heating water buffer storage unit ③ is lower than that set on the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ④ start to operate.

Secondary circuit of the heat pump
Heat pump ① supplies heat to the heating circuit.
The CD 60 control unit integrated into heat pump ① controls the heating water flow temperature and therefore the heating circuit.
Secondary pump ④ channels the heating water via three-way changeover valve ⑤, either to DHW cylinder ⑥ or to heating water buffer storage unit ③.
Heating circuit pumps ⑦ and ⑧ channel the required water volume into the heating circuits.

The flow rate in the heating circuit is regulated

- by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor and/or
- through an external heating circuit control unit.

Also, the flow rate can vary from that of heat pump circuits (secondary pump ④) through sizing heating circuit pumps ⑦ and ⑧. (Recommendation: The sum total of volume flow of heating circuit pumps ⑦ and ⑧ should be less than the volume flow of secondary pump ④). Install a heating water buffer storage unit ③ parallel to the heating circuit in order to compensate for the differences between these water volumes. Heat, that is not required by the heating circuits, is stored in parallel in heating water buffer storage unit ③. In addition, this provides a balanced heat pump operation (longer operating times).

5862 241 GB

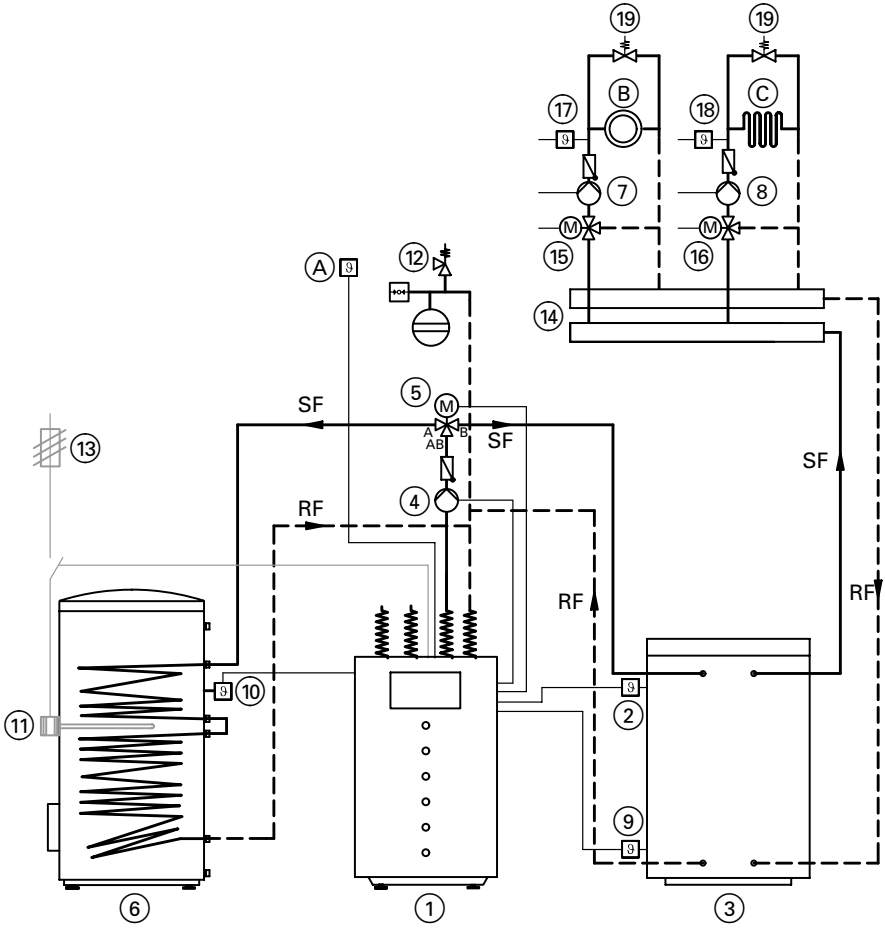
System version 3 (cont.)

Heat pump ① is switched off again, when the actual temperature measured by temperature sensor ⑨ of heating water buffer storage unit ③ has reached the temperature set at the CD 60 control unit. The heating circuits will then be supplied with heat by heating water buffer storage unit ③. Only when the temperature at upper temperature sensor ② of heating water buffer storage unit ③ falls below the set value will heat pump ① be switched on again.
The heating circuit will be supplied with heat by heating water buffer storage unit ③ in case the electricity supplier shuts down the heat pump.

DHW heating with the heat pump
In the "as delivered state", DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during the cheap tariff times, i.e. during the night. Heating demand is communicated via DHW cylinder temperature sensor ⑩ and the CD 60 control unit, which regulates three-way changeover valve ⑤.
The CD 60 control unit raises the flow temperature to the value required for DHW heating.
The DHW can be further heated by an electric supplementary heating system ⑪ (e.g. immersion heater element EHO). The CD 60 control unit switches the heating water flow to the heating circuit using three-way changeover valve ⑤, if the actual value measured at DHW temperature sensor ⑩ is higher than that set at the CD 60 control unit.

5862 241 GB

System version 3 (cont.)



Ⓐ Outside temperature sensor
Ⓑ Mixer circuit 1
Ⓒ Mixer circuit 2
(underfloor heating circuit)

VL Flow
RL Return

5862 241 GB

System version 3 (cont.)

Required equipment

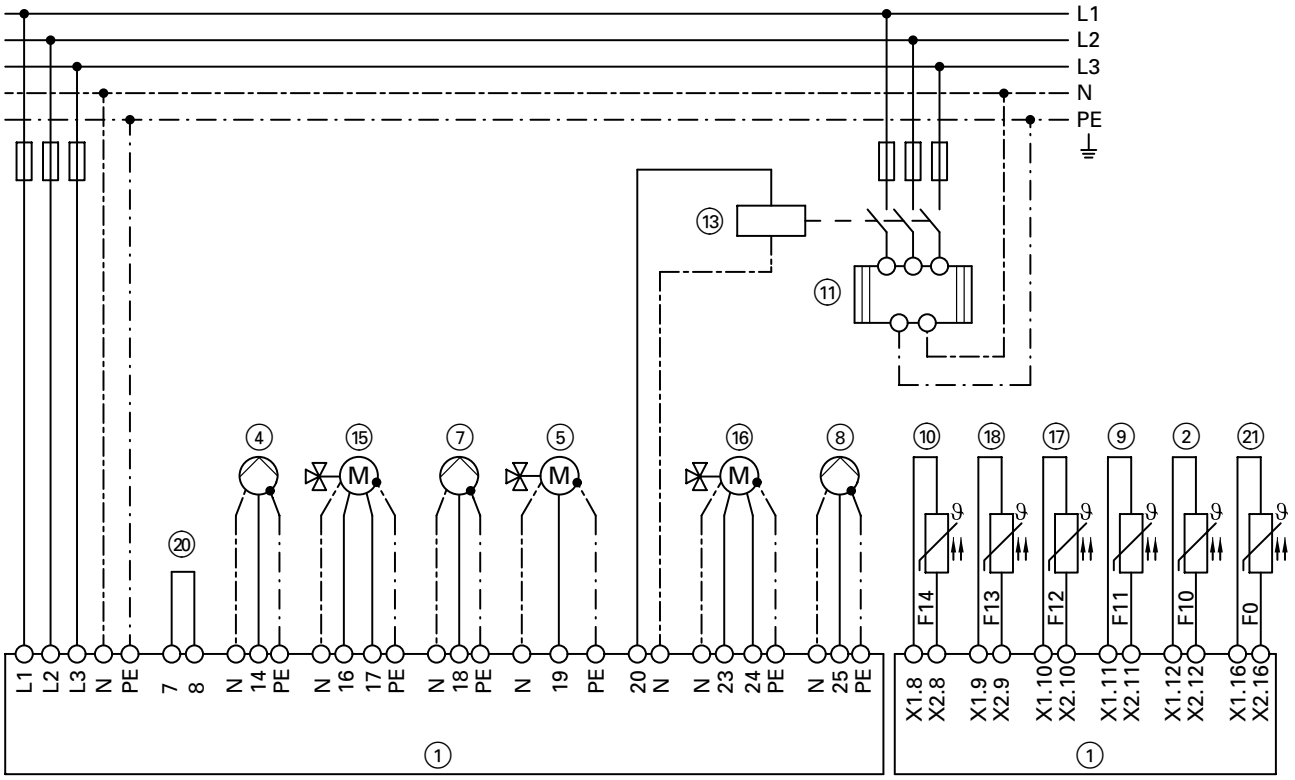
Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type AW, BW and WW	1	see type plate
②	Temperature sensor to establish the temperature within the heating water buffer storage unit (top)	1	7159 671
③	Heating water buffer storage unit Vitocell 050, type SVP (600 or 900 litres capacity)	1	see type plate
④	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑤	Three-way changeover valve Central heating/DHW heating ■ up to 18.5 kW rated output ■ from 18.5 kW rated output	1	 7814 924 7165 482
⑥	Domestic hot water cylinder ■ Vitocell-B 100, type CVB (300 or 500 litres capacity) ■ Vitocell-B 300, type EVB (350 or 500 litres capacity)	1	see type plate
⑦ ⑧	Modular-Divicon heating circuit distributor with ■ heating circuit pump, mixer circuit 1 ■ heating circuit pump, mixer circuit 2	1 each	see type plate
⑨	Temperature sensor to establish the temperature within the heating water buffer storage unit (bottom)	1	7159 671
⑩	Cylinder temperature sensor for measuring the DHW temperature	1	7159 671
⑪	Electrical supplementary heating system ■ Immersion heater element EHO[*1] ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 7265 198 on site
⑫	Safety equipment block (equipped)	1	7143 779
⑬	Contactor relay for activating the immersion heater element	1	7814 681
⑭	Flow and return distributor for modular Divicon	1	7147 860
⑮	Mixer motor, mixer circuit 1	1	7450 657
⑯	Mixer motor, mixer circuit 2	1	7450 657
⑰	Flow temperature sensor, mixer circuit 1	1	7450 642
⑱	Flow temperature sensor, mixer circuit 2	1	7450 642
⑲	Overflow valve	2	9557 010

*[*1]Only in conjunction with Vitocell-B 100.*

5862 241 GB

System version 3 (cont.)

Connection diagram



⑳ Optional connection conversion kit EVU shutdown, part no. 7162 386
㉑ Outside temperature sensor

5862 241 GB

System version 4

Mono-energetic operation with solar heating system and Vitocell 333

System definition

- Type AW: 134
- Type BW and WW
  - single stage: 34
  - two stage: 84

Primary circuit of the heat pump

If the actual temperature measured by upper contact temperature sensor ② of Vitocell 333 ③ or, in the case of DHW demand, at DHW cylinder temperature sensor ④ of Vitocell 333 ③, is lower than that set at the CD 60 control unit, the primary pump, the intermediate circuit pump and secondary pump ⑤ start to operate, with heat pump ① starting after a delay.

Secondary circuit of the heat pump and solar heating system

Heat pump ① supplies heat to the heating circuit.
Solar heating system Ⓒ primarily supports heat pump ① in between seasons, depending on the available solar energy. The CD 60 control unit integrated into heat pump ① and three-way mixer Ⓓ controls the heating water flow temperature of the heating circuit. If the heating circuit calls for heat, heat is first drawn from Vitocell 333 ③.
Heat pump ① starts, if the actual temperature measured at upper contact sensor ② on Vitocell 333 ③ is lower than the temperature set at the CD 60 control unit .
Vitocell 333 ③ is heated via three-way changeover valve ⑥ (position "AB – B").
Secondary pump ⑤ channels heating water to Vitocell 333 ③ or to the heating circuit.

Heat pump ① is switched off again, when the actual temperature measured by lower contact sensor ⑦ of Vitocell 333 ③ has reached the temperature set at the CD 60 control unit. Only when the temperature at upper contact sensor ② of Vitocell 333 ③ falls below the set value will heat pump ① be restarted. Heat pump ① will not start if the actual temperature measured at upper contact sensor ② is higher than the temperature set at the CD 60 control unit (Vitocell 333 ③ is sufficiently heated by the solar heating system). Under these circumstances, the heating circuit will be supplied with heat by heating circuit pump ⑧ drawing heat from Vitocell 333 ③.

5862 241 GB

System version 4 (cont.)

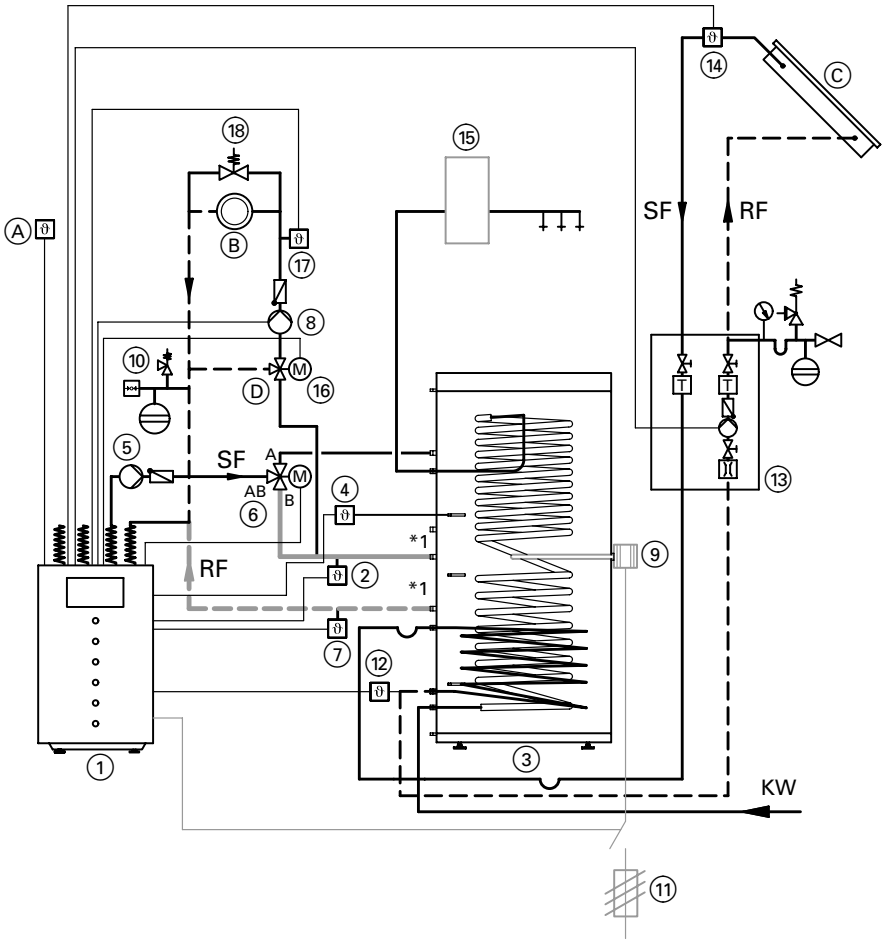
The flow rate within the heating circuit is regulated by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor. The sizing of heating circuit pump ⑧ can vary from that of the heat pump circuit (secondary pump ⑤). Install Vitocell 333 ③ as heating water buffer storage unit parallel to the heating circuit, in order to compensate for the differences in these water volumes. Heat not required by the heating circuit is stored in parallel by Vitocell 333 ③. In addition, this provides a balanced heat pump operation (longer operating times).
The heating circuit will be supplied with heat by Vitocell 333 ③ in case the electricity supplier shuts down the heat pump.

Domestic hot water heating with heat pumps and solar support
In the "as delivered condition", DHW heating through heat pump ① has priority over the heating circuit. Heating demand and end of heating is communicated via DHW cylinder temperature sensor ④ and the CD 60 control unit, which regulates three-way changeover valve ⑥ (position "AB – A") and switches heat pump ① on or off.
The CD 60 control unit raises the DHW cylinder temperature in the upper area of the cylinder to the value required for DHW heating.

The heated domestic hot water is stored in a corrugated stainless steel heat exchanger pipe with large diameter inside Vitocell 333 ③. Once this reserve is used up, any incoming cold water is pre-heated according to the direct water heating principle by the heating water stored in the lower cylinder area.
The water is subsequently heated to the required temperature level by the water stored in the upper storage area of Vitocell 333 ③ at DHW temperature.
If sufficient solar energy is available, the DHW can be heated exclusively by the solar system. The DHW can be further heated by an electric supplementary heating system ⑨ (e.g. immersion heater element EHO).
The CD 60 control unit switches the heating water flow to the heating circuit using three-way changeover valve ⑥ (position "AB – B"), if the actual value measured at DHW temperature sensor ④ is higher than that set at the CD 60 control unit.

5862 241 GB

System version 4 (cont.)



Ⓐ Outside temperature sensor
Ⓑ Heating circuit
Ⓒ Solar collector
Ⓓ Three-way mixer

KW Cold water
RL Return
VL Flow

*1 *At least one size up (DN) from the remaining pipework.*

5862 241 GB

System version 4 (cont.)

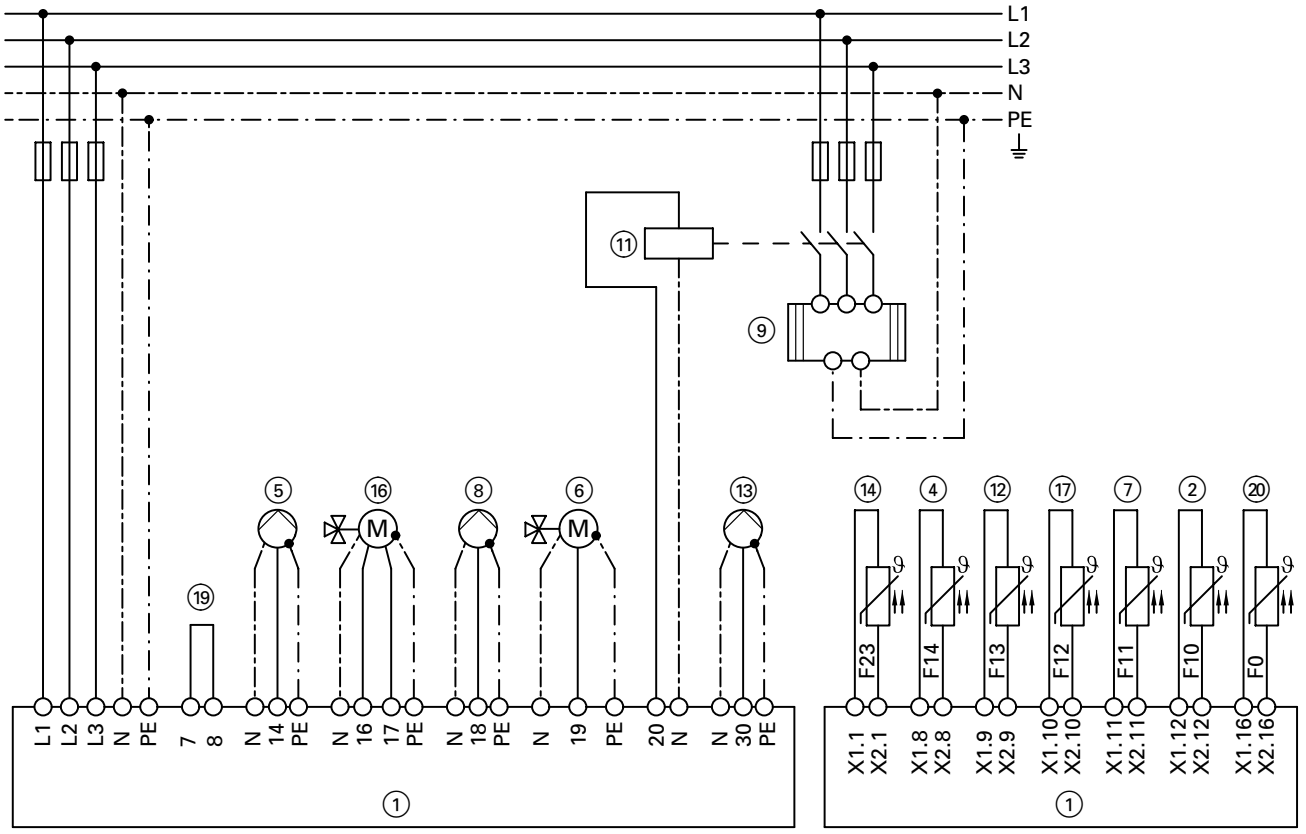
Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type AW, BW and WW	1	see type plate
②	Contact temperature sensor to establish the temp. within the heating water buffer storage unit (top)	1	9535 163
③	Heating water buffer storage unit with DHW heating, Vitocell 333, type SVK	1	3003 641
④	Cylinder temperature sensor for measuring DHW temperature; to be installed in the sensor well	1 1	7159 671 7265 060
⑤	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑥	Three-way changeover valve central heating/DHW heating ■ up to 18.5 kW rated output ■ from 18.5 kW rated output	1	 7814 924 7165 482
⑦	Contact temperature sensor to establish the temp. within the heating water buffer storage unit (bottom)	1	9535 163
⑧	Modular-Divicon heating circuit distributor with heating circuit pump	1	see type plate
⑨ ⑮	Electrical supplementary heating system ■ Immersion heater element EHO ■ Direct DHW heater (for pre-heated water up to 50 °C)	1	 7265 198 on site
⑩	Safety equipment block (equipped)	1	7143 779
⑪	Contactor relay for activating the immersion heater element	1	7814 681
⑯	Mixer motor	1	7450 657
⑰	Flow temperature sensor	1	7450 642
⑱	Overflow valve	1	9557 010
	Heating by solar collector		
⑫	Cylinder temperature sensor for measuring the DHW temperature; to be installed in the sensor well with (on-site) tee (½″ x 1″ x 1″) in the solar return pipe	1 1	7159 671 7819 700
⑬	Solar-Divicon (pumping station for the solar circuit) with circulation pump for the solar heating circuit	1	see type plate
⑭	Collector temperature sensor	1	7814 617

5862 241 GB

System version 4 (cont.)

Connection diagram



⑲ Optional connection conversion kit EVU shutdown, part no. 7162 386
⑳ Outside temperature sensor

5862 241 GB

System version 5 — Type BW and WW up to 17 kW

Mono-energetic operation – modulating system with DHW cylinder and Divicon heating circuit distributor

System definition
Type BW and WW
- single stage: 1
- two stage: 51

Primary circuit of the heat pump
If the actual temperature measured by the return temperature sensor in heat pump ① is lower than that set at the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ② start to operate.

Secondary circuit of the heat pump
Heat pump ① supplies heat to the heating circuit.
The CD 60 control unit integrated into heat pump ① controls the heating water flow temperature and therefore the heating circuit. The secondary pump ② channels the heating water via three-way changeover valve ③ either to DHW cylinder ④ or to the heating circuit.

The flow temperature can be raised with direct heating water heater ⑤ (accessory). The direct heating water heater ⑤ supplements the rated output during peak times at low outside temperatures (≦ –10 °C).
The flow rate within the heating circuit is regulated by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor. Install an overflow valve in the Divicon heating circuit distributor ⑥ to ensure the necessary constant flow through the heat pump circuit.
Cylinder ⑦ connected to the return provides the circulation volume required for heat pump ①, in order to ensure the essential minimum operating time of heat pump ①.
Heat pump ①, primary pump and the intermediate circuit pump are switched off, if the actual return temperature at the return temperature sensor is higher than the value set at the CD 60 control unit.

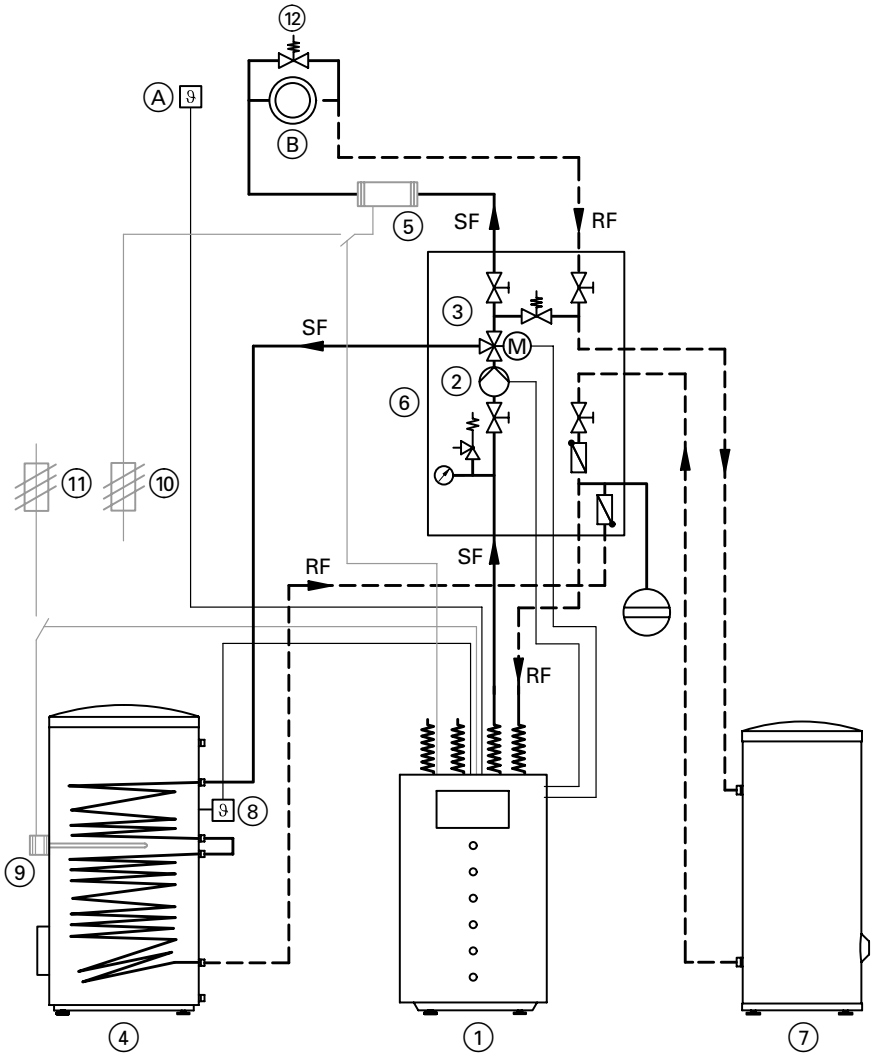
5862 241 GB

System version 5 (cont.) — Type BW and WW to 17 kW

DHW heating by heat pump
In the "as delivered condition", DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during cheap tariff times, i.e. during the night.
Heating demand is communicated via DHW cylinder temperature sensor ⑧ and the CD 60 control unit, which regulates three-way changeover valve ③. The CD 60 control unit raises the flow temperature to the value required for DHW heating.
The DHW can be further heated by an electric supplementary heating system ⑨ (e.g. immersion heater element EHO).
The CD 60 control unit switches the heating water flow to the heating circuit using three-way changeover valve ③, if the actual value measured at DHW temperature sensor ⑧ is higher than that set at the CD 60 control unit.

5862 241 GB

System version 5 (cont.) — Type BW and WW to 17 kW



Ⓐ Outside temperature sensor
Ⓑ Heating circuit
RL Return
VL Flow

5862 241 GB

System version 5 (cont.) — Type BW and WW to 17 kW

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type BW and WW	1	see type plate
④	Domestic hot water cylinder ■ Vitocell-B 100, type CVB (300 or 500 litres capacity) ■ Vitocell-B 300, type EVB (350 or 500 litres capacity)	1	see type plate
⑤	Direct heating water heater ■ 3 kW ■ 6 kW	1	 9532 654 7143 761
⑥ ② ③	Divicon heating circuit distributor incl. ■ secondary pump (Grundfos UPS 25-60) and ■ three-way changeover valve	1	3004 147
⑦	Heating water buffer storage unit Vitocell 050, type SVW (200 litres capacity)	1	3003 681
⑧	Cylinder temperature sensor for measuring the DHW temperature	1	7159 671
⑨	Electrical supplementary heating system ■ Immersion heater element EHO[*1] ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 7265 198 on site
⑩	Contactor relay for activating the direct DHW heater	1	7814 681
⑪	Contactor relay for activating the immersion heater element	1	7814 681
⑫	Overflow valve	1	on site

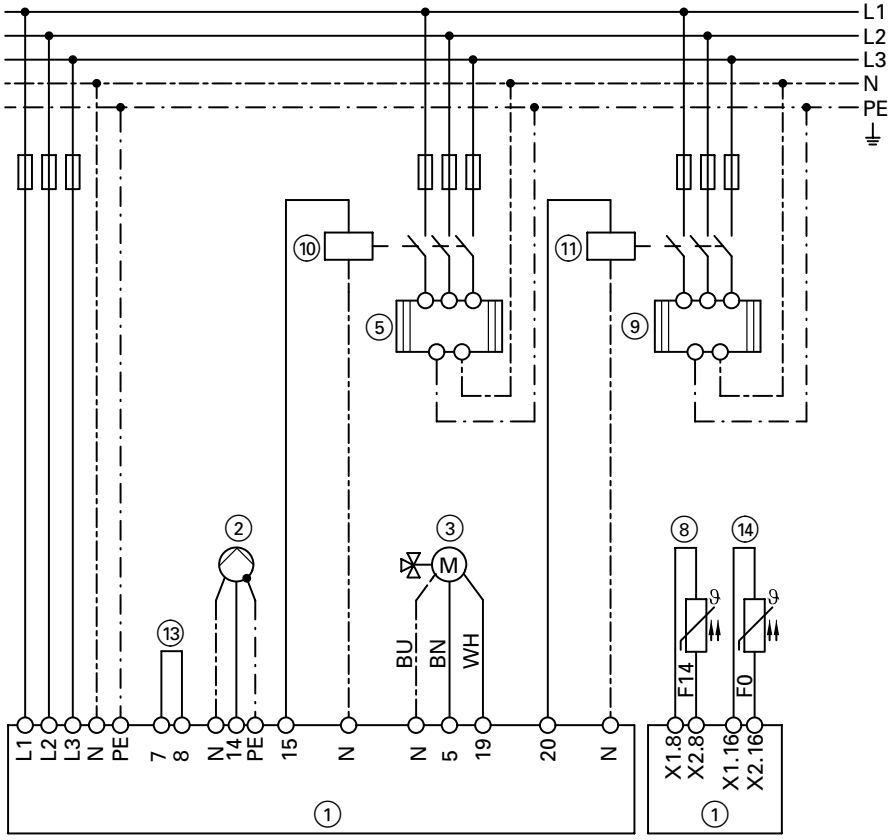
[*1] *Only in conjunction with Vitocell-B 100.*

5862 241 GB

System version 5 (cont.)

Type BW and WW to 17 kW

Connection diagram



Colour coding conforming to DIN IEC 757

BN brown
BU blue
WH white

⑬ Optional connection conversion kit EVU shutdown, part no. 7162 386
⑭ Outside temperature sensor

5862 241 GB

System version 6 — Type BW and WW

Dual parallel operation with free-standing boiler

System definition
Type BW and WW
- single stage: 27
- two stage: 77

Central heating using a heat pump
If the actual temperature measured by upper temperature sensor ② of heating water buffer storage unit ③ is lower than that set at the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ④ start to operate.

Central heating using a boiler
Heat for central heating is initially called from heating water buffer storage unit ③. If the actual temperature measured by upper temperature sensor ② of heating water buffer storage unit ③ is lower than that set at the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ④ start to operate. If the actual temperature at upper temperature sensor ② of heating water buffer storage unit ③ will not reach the temperature set at the CD 60 control unit within a time also set at the same CD 60 control unit, boiler Ⓑ will be regulated in accordance with the prevailing demand. In this connection, the CD 60 control unit enables the boiler control unit via a contactor relay ⑤, and three-way changeover valve ⑥ is set to position "AB – A". The central heating is then supplemented by the boiler acc. to the boiler control unit setting. The boiler control unit and thereby the boiler are disabled via contactor relay ⑤, if the temperature measured at the lower temperature sensor ⑦ of the heating water buffer storage unit ③ has reached the temperature set at the CD 60 control unit.
Dual parallel operation is designed to increase output, and is limited to a max. flow temperature of 55 °C. Set the boiler curve accordingly.
Three-way changeover valve ⑥ is switched to position "AB – B".
Heat pump ① and secondary pump ④ are switched off via the CD 60 control unit.

5862 241 GB

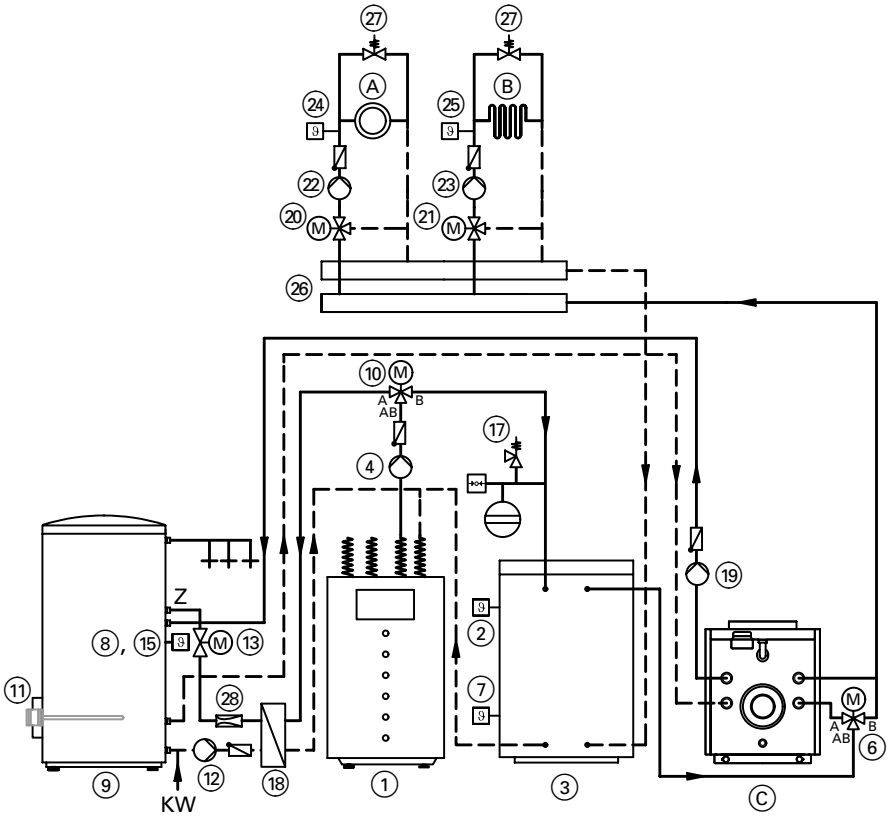
System version 6 (cont.) — Type BW and WW

DHW heating by heating water buffer storage unit via heat pump
In the "as delivered condition", the DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during the cheap tariff times, i.e. during the night.
Heating demand is communicated via the cylinder temperature sensor ⑧ of DHW cylinder ⑨ and the CD 60 control unit, which switches three-way changeover valve ⑩ to "AB – A". Secondary pump ④ starts to operate. The CD 60 control unit raises the flow temperature to the value required for DHW heating. The DHW temperature can be raised to a max. of 50 °C.
The DHW can be further heated by either an electric supplementary heating system ⑪ (e.g. immersion heater element EHO) or by a second heat generator (boiler).
The CD 60 control unit switches three-way changeover valve ⑩ and heat pump ① to heating operation (position "AB – B"), if the actual value measured at DHW temperature sensor ⑧ is higher than that set at the CD 60 control unit. DHW circulation pump ⑫ will be switched off, and two-way valve ⑬ will be closed.

DHW heating by boiler
The boiler heats the DHW after being enabled by the CD 60 control unit. Contactor relay ⑭ causes the boiler to be enabled, which in turn enables DHW cylinder temperature sensor ⑮ linked to the boiler. If the CD 60 control unit blocks the boiler from heating DHW, DHW temperature sensor ⑮ will be switched via contactor relay ⑭ through fixed resistor ⑯ (100 Ω). This simulates a DHW temperature, which is approx. 50 K higher; this will be displayed in the Viessmann Vitotronic control unit.

5862 241 GB

System version 6 (cont.) — Type BW and WW



Ⓐ Mixer circuit 1
Ⓑ Mixer circuit 2
(underfloor heating circuit)
Ⓒ Oil-/gas-fired boiler

KW Cold water
RL Return
VL Flow
Z DHW circulation

5862 241 GB

System version 6 (cont.) — Type BW and WW

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type BW and WW	1	see type plate
②	Temperature sensor to establish the temperature within the heating water buffer storage unit (top)	1	7159 671
③	Heating water buffer storage unit Vitocell 050, type SVP (600 or 900 litres capacity)	1	see type plate
④	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑦	Temperature sensor to establish the temperature within the heating water buffer storage unit (bottom)	1	7159 671
⑧	DHW cylinder temperature sensor for measuring the DHW temperature (CD 60 control unit)	1	7159 671
⑨	Domestic hot water cylinder ■ Vitocell-V 100, type CVA (300 to 1000 litres capacity) ■ Vitocell-V 300, type EVI (350 or 500 litres capacity)	1	see type plate
⑩	Three-way changeover valve Central heating/DHW heating ■ up to 18.5 kW rated heat pump output ■ from 18.5 kW rated heat pump output	1	 7814 924 7165 482
⑪	Electrical supplementary heating system ■ Immersion heater element EHO*1 (on-site control unit) ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 see type plate on site
⑫	Circulation pump for DHW cylinder heating (suitable for DHW, for heat exchanger)	1	on site
⑬	Two-way valve	1	on site
㉛	Contactor relay for activating the DHW heating (heat exchanger)	1	7814 681
⑰	Safety equipment block (equipped)	1	7143 779

5862 241 GB

System version 6 (cont.) — Type BW and WW

Item	Description	Number	Part no.
⑱	Vitotrans 100 heat exchanger	1	see type plate
⑳	Mixer motor, mixer circuit 1	1	7450 657
㉑	Mixer motor, mixer circuit 2	1	7450 657
㉒ ㉓	Modular-Divicon heating circuit distributor with ■ heating circuit pump, mixer circuit 1 ■ heating circuit pump, mixer circuit 2	1	see type plate
㉔	Flow temperature sensor, mixer circuit 1	1	7450 642
㉕	Flow temperature sensor, mixer circuit 2	1	7450 642
㉖	Flow and return distributor for modular Divicon	1	7147 860
㉗	Overflow valve	2	9557 010
㉘	Volume flow limiter	1	on site
	Central heating by boiler		
⑤	Contactor relay for activating the three-way changeover valve and for enabling the boiler	1	7814 681
⑥	Three-way changeover valve central heating heat pump/central heating boiler	1	
	■ up to 18.5 kW rated heat pump output		7814 924
	■ from 18.5 kW rated heat pump output		7165 482
	DHW heating by boiler		
⑭	Contactor relay for activating the DHW heating by boiler	1	7814 681
⑮	Cylinder temperature sensor for measuring the DHW temperature (boiler control unit)	1	7159 671
⑯	Fixed resistor 100 Ω/0.25 W	1	on site
⑲	Circulation pump for DHW cylinder heating (boiler control unit)	1	see type plate

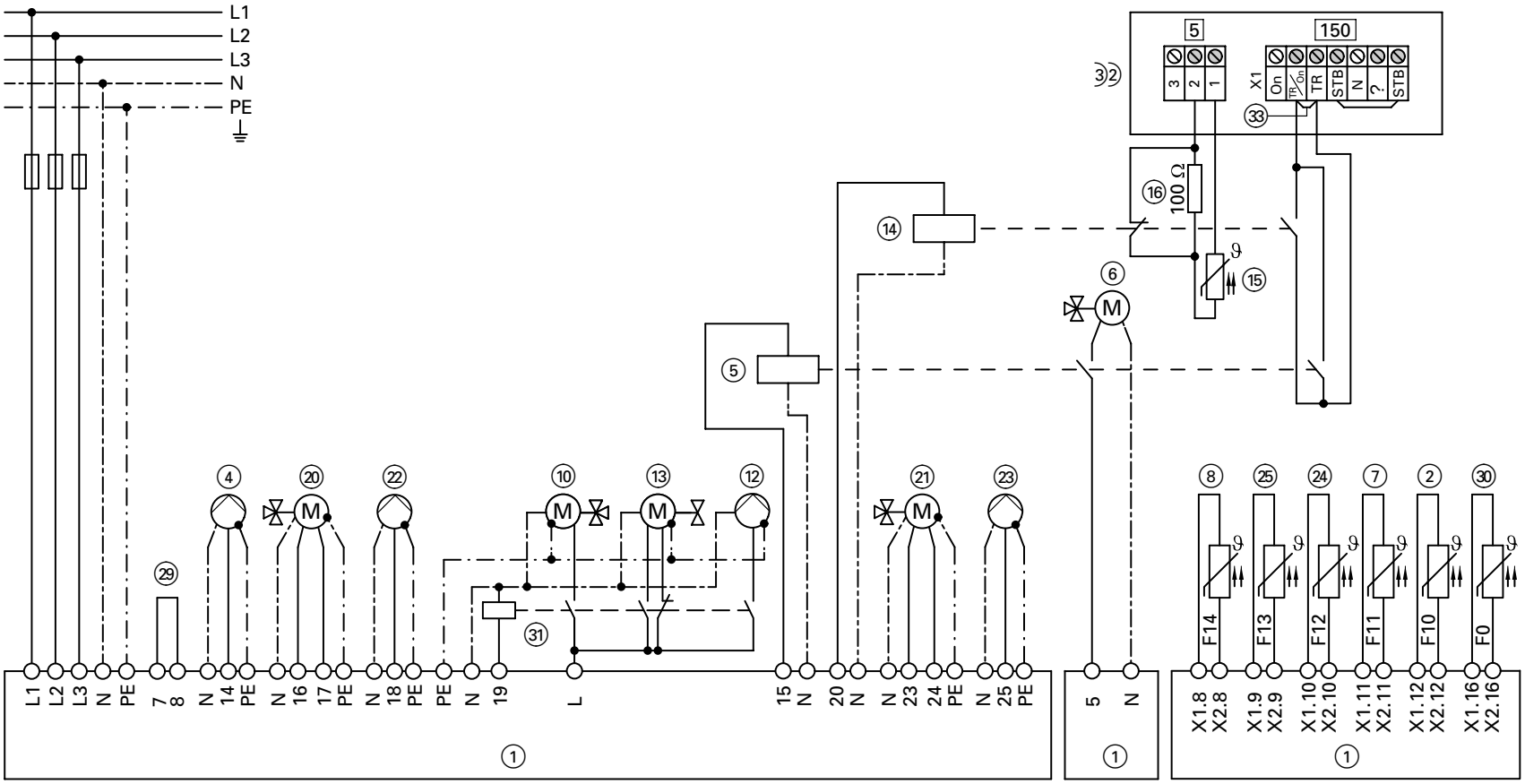
*[*1] Only with Vitocell-V 100, type CVA, 300 to 500 litres capacity and Vitocell-V 300, type EVI, with flange aperture.*

System version 6 (cont.) **Type BW and WW**

System version 6 (cont.)

Type BW and WW

Connection diagram



(29) Optional connection conversion kit EVU shutdown, part no. 7162 386
(30) Outside temperature sensor (CD 60 control unit)
(31) Contactor relay, part no. 7814 681
(32) Vitotronic (boiler control unit)
(33) Remove jumper when making this connection

5862 241 GB

System version 7 — Type AW

Dual alternative operation with free-standing boiler

System definition
Type AW: 127

Central heating using a heat pump
If the actual temperature measured by upper temperature sensor ② of heating water buffer storage unit ③ is lower than that set at the CD 60 control unit, heat pump ① and secondary pump ④ start to operate.

Central heating using a boiler
Heat for central heating is initially called from heating water buffer storage unit ③. If the actual temperature measured by the outside temperature sensor falls below the temperature bivalence value set at the CD 60 control unit, three-way changeover valves ⑥ and ⑦ will be set to position "AB – A" by the CD 60 control unit via contactor relay ⑤. At the same time the boiler control unit is enabled via contactor relay ⑤. Heat pump ① will then be disabled. Below the bivalence temperature, heat is provided exclusively by the boiler and in accordance with the settings of the boiler control unit. Heat pump ① will be enabled to provide heat, and the boiler will be blocked, if the actual temperature measured by the outside temperature sensor exceeds the bivalence temperature set at the CD 60 control unit (average over a six hour period). For this purpose, three-way changeover valves ⑥ and ⑦ will be switched to position "AB – B".

5862 241 GB

System version 7 (cont.) Type AW

DHW heating by heating water buffer storage unit via the heat pump

In the "as delivered state", DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during cheap tariff times, i.e. during the night.

Heating demand is communicated via cylinder temperature sensor ⑧ of DHW cylinder ⑨ and the CD 60 control unit, which sets three-way changeover valve ⑩ to "AB – A". Secondary pump ④ starts to operate. The CD 60 control unit raises the flow temperature to the value required for DHW heating. The DHW temperature can be raised to a max. of 50 °C.

The DHW can be further heated by either an electric supplementary heating system ⑪ (e.g. immersion heater element EHO) or by a second heat generator (boiler).

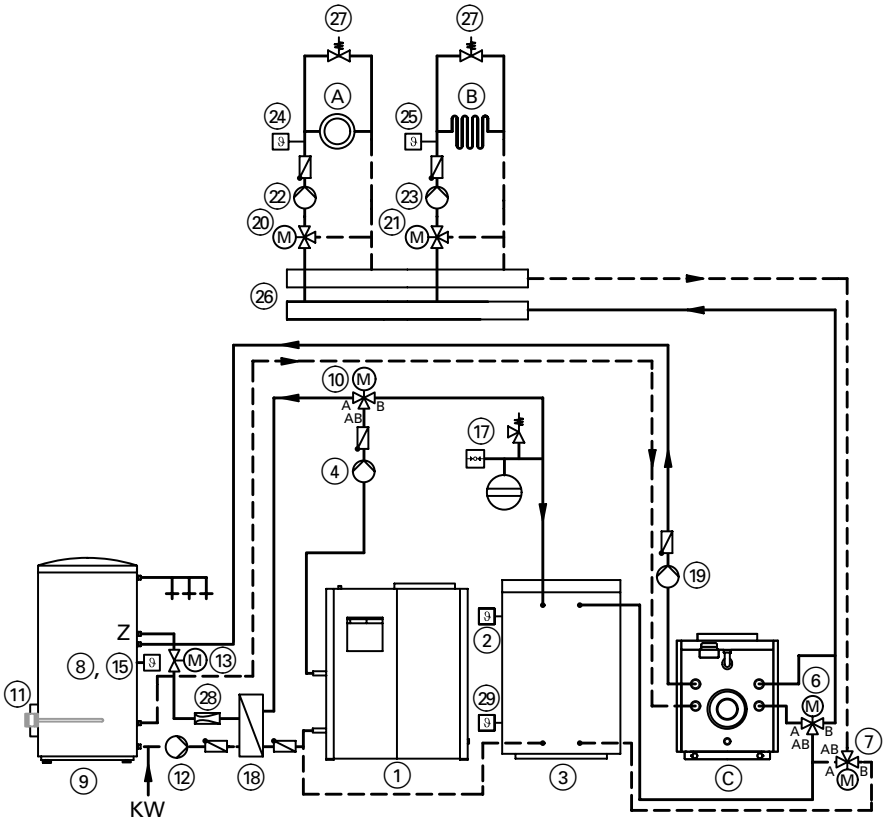
The CD 60 control unit sets three-way changeover valve ⑩ and heat pump ① to heating operation (position "AB – B"), if the actual value measured at DHW temperature sensor ⑧ exceeds that set at the CD 60 control unit. DHW circulation pump ⑫ will be switched off, and two-way valve ⑬ will be closed.

DHW heating by boiler

The boiler heats the DHW after being enabled by the CD 60 control unit. A contactor relay ⑭ causes the boiler to be enabled, which in turn enables DHW cylinder temperature sensor ⑮ linked to the boiler. If the CD 60 control unit blocks the boiler from heating DHW, DHW temperature sensor ⑮ will be switched via contactor relay ⑭ through a fixed resistor ⑯ (100 Ω). This simulates a DHW temperature which is approx. 50 K higher; this will be displayed on the Viessmann Vitotronic control unit.

5862 241 GB

System version 7 (cont.) — Type AW



Ⓐ Mixer circuit 1
Ⓑ Mixer circuit 2
(underfloor heating circuit)
Ⓒ Oil-/gas-fired boiler

KW Cold water
RL Return
VL Flow
Z DHW circulation

5862 241 GB

System version 7 (cont.) Type AW

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type AW	1	see type plate
②	Temperature sensor to establish the temperature within the heating water buffer storage unit (top)	1	7159 671
③	Heating water buffer storage unit Vitocell 050, type SVP (600 or 900 litres capacity)	1	see type plate
④	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑧	DHW cylinder temperature sensor for measuring the DHW temperature (CD 60 control unit)	1	7159 671
⑨	Domestic hot water cylinder ■ Vitocell-V 100, type CVA (300 to 1000 litres capacity) ■ Vitocell-V 300, type EVI (350 or 500 litres capacity)	1	see type plate
⑩	Three-way changeover valve Central heating/DHW heating ■ up to 18.5 kW rated heat pump output ■ from 18.5 kW rated heat pump output	1	 7814 924 7165 482
⑪	Electrical supplementary heating system ■ Immersion heater element EHO*1 (on-site control unit) ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 see type plate on site
⑫	Circulation pump for DHW cylinder heating (suitable for DHW, for heat exchanger)	1	on site
⑬	Two-way valve	1	on site
㉜	Contactor relay for activating DHW heating (heat exchanger)	1	7814 681
⑰	Safety equipment block (equipped)	1	7143 779
⑱	Vitotrans 100 heat exchanger	1	see type plate

5862 241 GB

System version 7 (cont.) — Type AW

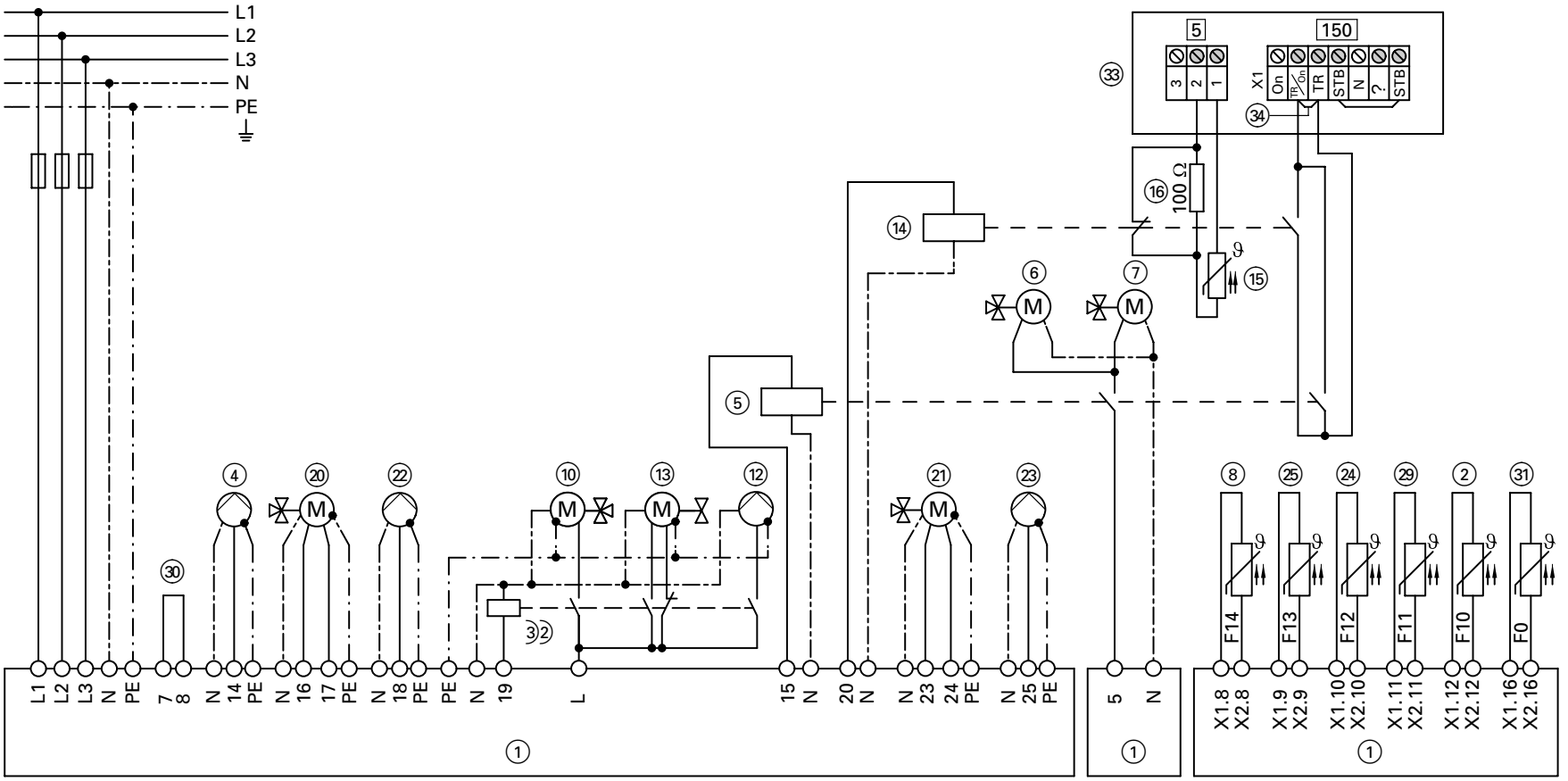
Item	Description	Number	Part no.
⑳	Mixer motor, mixer circuit 1	1	7450 657
㉑	Mixer motor, mixer circuit 2	1	7450 657
㉒ ㉓	Modular-Divicon heating circuit distributor with ■ heating circuit pump, mixer circuit 1 ■ heating circuit pump, mixer circuit 2	1 each	see type plate
㉔	Flow temperature sensor, mixer circuit 1	1	7450 642
㉕	Flow temperature sensor, mixer circuit 2	1	7450 642
㉖	Flow and return distributor for modular Divicon	1	7147 860
㉗	Overflow valve	2	9557 010
㉘	Volume flow limiter	1	on site
㉙	Temperature sensor to establish the temperature within the heating water buffer storage unit (bottom)	1	7159 671
	Central heating by boiler		
⑤	Contactor relay for activating the three-way changeover valves and for enabling the boiler	1	7814 681
⑥ ⑦	Three-way changeover valve central heating heat pump/central heating boiler ■ up to 18.5 kW rated heat pump output ■ from 18.5 kW rated heat pump output	2	 7814 924 7165 482
	DHW heating by boiler		
⑭	Contactor relay for activating DHW heating by boiler	1	7814 681
⑮	Cylinder temperature sensor for measuring the DHW temperature (boiler control unit)	1	7159 671
⑯	Fixed resistor 100 Ω/0.25 W	1	on site
⑲	Circulation pump for DHW cylinder heating (boiler control unit)	1	see type plate

*[*1]Only with Vitocell-V 100, type CVA, 300 to 500 litres capacity and Vitocell-V 300, type EVI, with flange aperture.*

System version 7 (cont.) **Type AW**

System version 7 (cont.) — Type AW

Connection diagram



㉚ Optional connection conversion kit EVU shutdown, part no. 7162 386
㉛ Outside temperature sensor (CD 60 control unit)
㉜ Contactor relay, part no. 7814 681
㉝ Vitotronic (boiler control unit)
㉞ Remove jumper when making this connection

5862 241 GB

System version 8 — Type BW and WW

Dual parallel operation with wall-mounted oil-/gas-fired boiler

System definition
Type BW and WW:
- single stage: 27
- two stage: 77

Primary circuit of the heat pump
If the actual temperature measured by upper temperature sensor ② of heating water buffer storage unit ③ is lower than that set at the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ④ start to operate.

Secondary circuit of the heat pump
Heat pump ① supplies heat to the heating circuit.
The CD 60 control unit integrated into heat pump ① controls the heating water flow temperature and therefore the heating circuit.
Secondary pump ④ channels the heating water via three-way changeover valve ⑤, either to DHW cylinder ⑥ or to heating water buffer storage unit ③.
Heating circuit pumps ⑦ and ⑧ channel the required water volume into the heating circuits. This generally creates a flow through low loss header ⑨.
The flow rate in the heating circuits is regulated
- by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor and/or
- through an external heating circuit control unit.

Also, the flow rate can vary from that of heat pump circuits (secondary pump ④) through sizing heating circuit pumps ⑦ and ⑧.
Recommendation: The sum total of volume flow of heating circuit pumps ⑦ and ⑧ should be less than the volume flow of secondary pump ④. Install a heating water buffer storage unit ③ parallel to the heating circuit in order to compensate for the differences between these water volumes. Heat not required by the heating circuits is stored in parallel in heating water buffer storage unit ③. This also provides a balanced heat pump operation (longer operational times).
Heat pump ① is stopped again, when the actual temperature measured by bottom temperature sensor ⑩ of heating water buffer storage unit ③ has reached the temperature set at the CD 60 control unit. The heating circuit will then be supplied with heat by heating water buffer storage unit ③. Only when the temperature at upper temperature sensor ② of heating water buffer storage unit ③ falls below the set value will heat pump ① be started again.
The heating circuit will be supplied with heat by heating water buffer storage unit ③ in case the electricity supplier shuts down the heat pump.

5862 241 GB

System version 8 (cont.) — Type BW and WW

Central heating with the wall-mounted boiler
Heat for central heating is initially called from the sensor in the heating water buffer storage unit ③, whilst also considering the heating circuit flow temperature.
Contactor relay ⑪ is activated, which enables the wall-mounted boiler, if the average outside temperature falls below the outside temperature bivalence point set at the CD 60 control unit. This utilises the external control option of wall-mounted boilers (relocate jumper "X6" on PCB VR 20 in accordance with the service instructions).
The wall-mounted boiler now functions acc. to the programmed heating curve, which should be identical to the heat pump ① curve, to avoid high return temperatures. The max. flow temperature should be limited to 55 °C. Low loss header ⑨ with DHW temperature sensor ⑫ acts as hydraulic de-coupler and set value transmitter.

DHW heating by heat pump
In the "as delivered state", DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during cheap tariff times, i.e. during the night.
Heating demand is communicated via DHW cylinder temperature sensor ⑭ and the CD 60 control unit, which regulates three-way change-over valve ⑤.

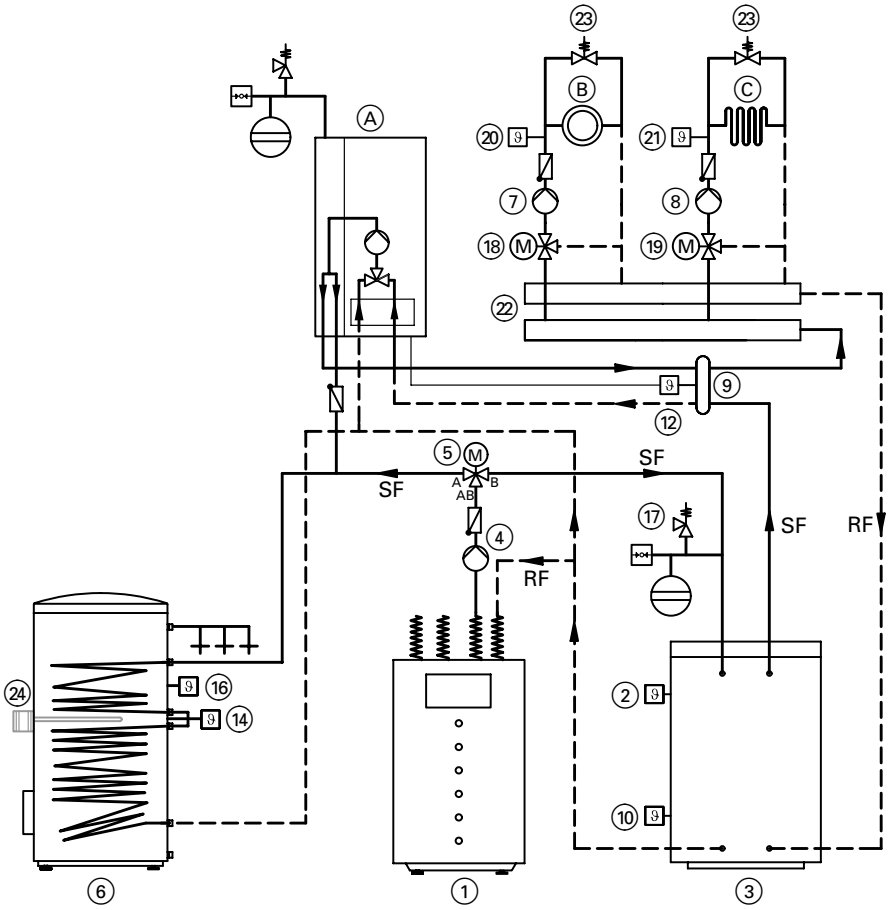
The heat pump raises the flow temperature to the value required for DHW heating.

The CD 60 control unit regulates the heating water flow to the heating circuit using three-way changeover valve ⑤, if the actual value measured at DHW temperature sensor ⑭ exceeds that set at the CD 60 control unit.

DHW heating with the wall-mounted boiler
The wall-mounted boiler heats the DHW after being enabled by the CD 60 control unit.
Contactor relay ⑬ causes the boiler to be enabled, which in turn enables DHW cylinder temperature sensor ⑯ linked to the wall-mounted boiler.
As for central heating, the burner is enabled by external control. In order to safeguard the DHW priority even in dual parallel operation, DHW heating will be suppressed via fixed resistor ⑮ (2 kΩ), since only heat pump ① should enable the system.
Accordingly, match up the switching times for DHW heating between heat pump ① and the wall-mounted boiler. When DHW heating has been enabled, three-way changeover valve ⑤ is set to heating operation.

5862 241 GB

System version 8 (cont.) — Type BW and WW



Ⓐ Wall-mounted oil-/gas-fired boiler with weather-compensated control unit
Ⓑ Mixer circuit 1
Ⓒ Mixer circuit 2 (underfloor heating circuit)

RL Return
VL Flow

5862 241 GB

System version 8 (cont.) — Type BW and WW

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type BW and WW	1	see type plate
②	Temperature sensor to establish the temperature within the heating water buffer storage unit (top)	1	7159 671
③	Heating water buffer storage unit Vitocell 050, type SVP (600 or 900 litres capacity)	1	see type plate
④	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑤	Three-way changeover valve Central heating/DHW heating ■ up to 18.5 kW rated heat pump output ■ from 18.5 kW rated heat pump output	1	 7814 924 7165 482
⑥	Domestic hot water cylinder ■ Vitocell-B 100, type CVB (300 or 500 litres capacity) ■ Vitocell-B 300, type EVB (350 or 500 litres capacity)	1	see type plate
⑦ ⑧	Modular-Divicon heating circuit distributor with ■ Heating circuit pump, mixer circuit 1 ■ Heating circuit pump, mixer circuit 2	1 each	see type plate
⑩	Temperature sensor to establish the temperature within the heating water buffer storage unit (bottom)	1	7159 671
⑭	DHW cylinder temperature sensor for measuring the DHW temperature (CD 60 control unit)	1	7159 671
⑰	Safety equipment block (equipped)	1	7143 779
⑱	Mixer motor, mixer circuit 1	1	7450 657
⑲	Mixer motor, mixer circuit 2	1	7450 657
⑳	Flow temperature sensor, mixer circuit 1	1	7450 642
㉑	Flow temperature sensor, mixer circuit 2	1	7450 642
㉒	Flow and return distributor for modular Divicon	1	7147 860
㉓	Overflow valve	2	9557 010

5862 241 GB

System version 8 (cont.) — Type BW and WW

Item	Description	Number	Part no.
㉔	Electrical supplementary heating system ■ Immersion heater element EHO*1 (on-site control unit) ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 7265 198 on site
	Central heating by the wall-mounted oil-/gas-fired boiler with weather-compensated control unit		
⑨	Low loss header	1	on site
⑪	Contactor relay for enabling the wall-mounted boiler	1	7814 681
⑫	Cylinder temperature sensor used in the low loss header	1	7819 601
	DHW heating by the wall-mounted oil-/gas-fired boiler with weather-compensated control unit		
⑬	Contactor relay for activating the DHW heating by the wall-mounted boiler	1	7814 681
⑮	Fixed resistor 2 kΩ/0.25 W	1	on site
⑯	Cylinder temperature sensor for measuring the DHW temperature (wall-mounted boiler control unit)	1	7819 601

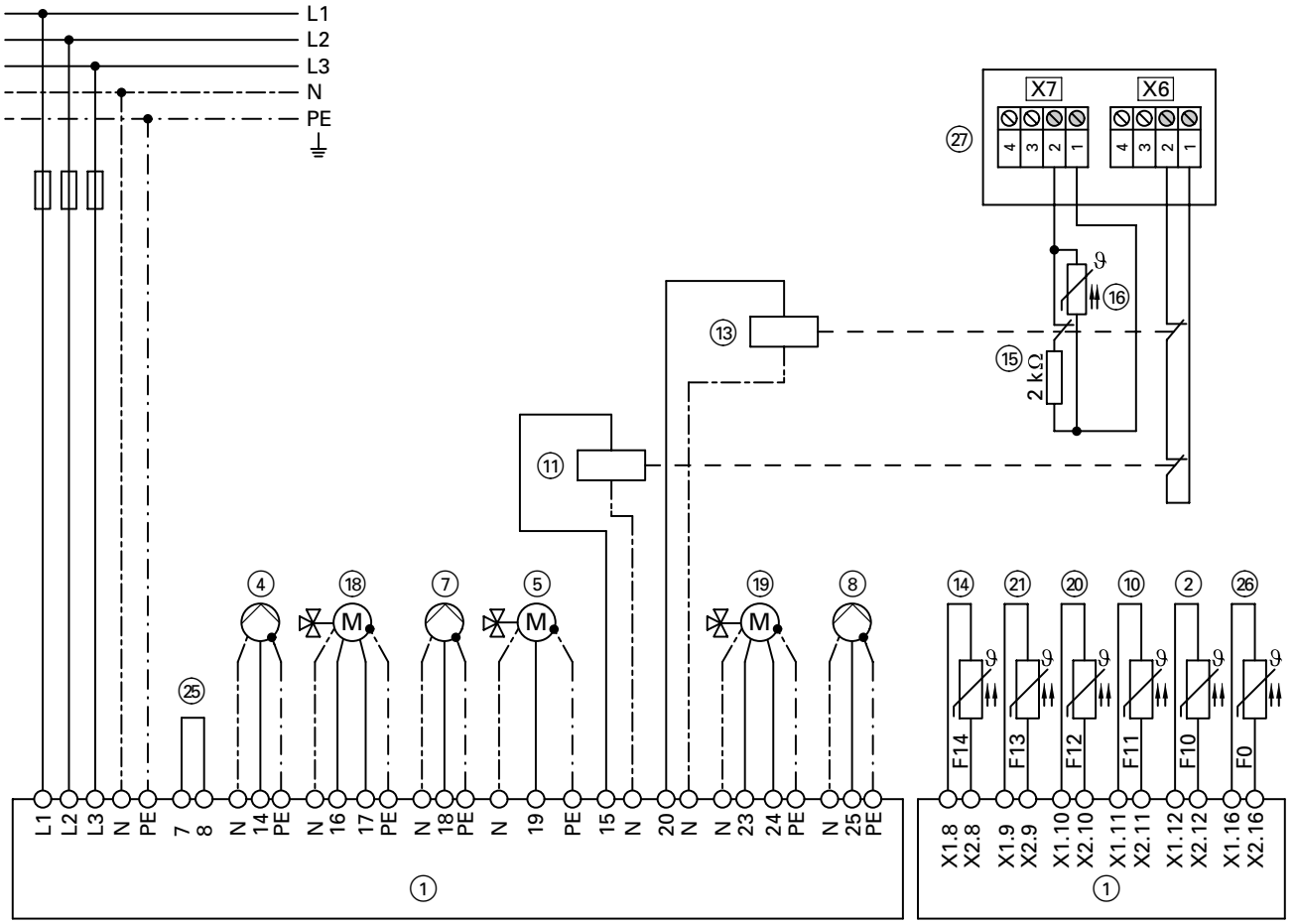
*1 *Only in conjunction with Vitocell-B 100.*

System version 8 (cont.) **Type BW and WW**

System version 8 (cont.)

Type BW and WW

Connection diagram



(25) Optional connection conversion kit EVU shutdown, part no. 7162 386
(26) Outside temperature sensor (CD 60 control unit)
(27) Wall-mounted oil-/gas-fired boiler with weather-compensated control unit

5862 241 GB

System version 9 — Type AW

Dual alternative operation with wall-mounted oil-/gas-fired boiler

System definition
Type AW: 127

Heat pump ventilation air inlet (primary)
If the actual temperature measured by upper temperature sensor ② of heating water buffer storage unit ③ or, in case of DHW demand at cylinder temperature sensor ④ of DHW cylinder ⑤, is lower than that set at the CD 60 control unit, heat pump ① and secondary pump ⑥ start to operate.

Secondary circuit of the heat pump
Heat pump ① supplies heat to the heating circuit.
The control unit CD 60 integrated into heat pump ① controls the heating water flow temperature and therefore the heating circuit.
Secondary pump ⑥ channels the heating water via three-way changeover valve ⑦, either to DHW cylinder ⑤ or to heating water buffer storage unit ③.
Heating circuit pumps ⑧ and ⑨ circulate the required water volume in the heating circuits. Generally, this causes water to flow through heating water buffer storage unit ③ via three-way changeover valve ⑩, which is opened via a zero-volt contact, and through low loss header ⑪. The flow rate in the heating circuits is regulated

- by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor and/or
- through an external heating circuit control unit.

Also, the flow rate can vary from that of the heat pump circuits (secondary pump ⑥) through sizing heating circuit pumps ⑧ and ⑨.
Recommendation: The sum total of volume flow of heating circuit pumps ⑧ and ⑨ should be less than the volume flow of secondary pump ⑥. Install a heating water buffer storage unit ③ parallel to the heating circuit in order to compensate for the differences between these water volumes. Heat not required by the heating circuits is stored in parallel in heating water buffer storage unit ③. In addition, this provides a balanced heat pump operation (longer operational times).

5862 241 GB

System version 9 (cont.) Type AW

Heat pump ① is switched off again, when the actual temperature measured by temperature sensor ⑫ of heating water buffer storage unit ③ has reached the temperature set at the CD 60 control unit. The heating circuit will then be supplied with heat by heating water buffer storage unit ③. Only when the temperature at upper temperature sensor ② of heating water buffer storage unit ③ falls below the set value will heat pump ① be started again.
The heating circuit will be supplied with heat by heating water buffer storage unit ③ in case the electricity supplier shuts down the heat pump.

Central heating with the wall-mounted boiler
Heat for central heating is initially called from the sensor in the heating water buffer storage unit ③, whilst also considering the heating circuit flow temperature.
A contactor relay ⑬ is activated, which enables the wall-mounted boiler and activates three-way changeover valve ⑩, if the average outside temperature falls below the outside temperature bivalence point set at the CD 60 control unit.
In this case the option of external control of the wall-mounted boilers is utilised (relocate jumper "X6"on PCB VR 20 in accordance with the service instructions).
Heating water buffer storage unit ③ will then no longer be supplied by heating circuit pumps ⑧ and ⑨.
The wall-mounted boiler then only operates in accordance with the stored heating curve. Heat pump ① is switched off by the CD 60 control unit, based on the programmed parameters. The maximum flow temperature during the operation of the wall-mounted boiler is only limited by these parameters or the mixer curve. Low loss header ⑪ with cylinder temperature sensor ⑭ acts as hydraulic de-coupler and set value transmitter for the wall-mounted boiler.
The bivalence and switch-off temperatures should be set to the same value.

DHW heating by heat pump
In the "as delivered conditions", the DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during the cheap tariff times, i.e. during the night.
Heating demand is communicated via DHW cylinder temperature sensor ④ and the control unit CD 60, which regulates three-way change-over valve ⑦. The heat pump raises the flow temperature to the value required for DHW heating.
The CD 60 control unit switches the heating water flow to the heating circuit using three-way changeover valve ⑦, if the actual value measured at DHW temperature sensor ④ is higher than that set at the CD 60 control unit .

5862 241 GB

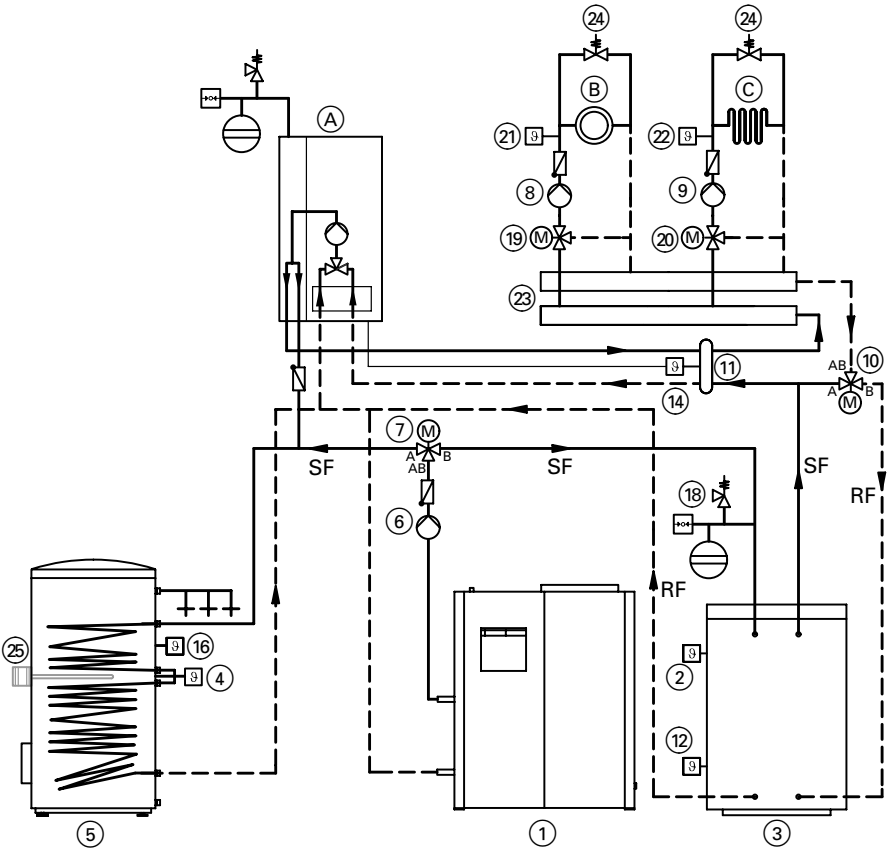
System version 9 (cont.) — Type AW

DHW heating with the wall-mounted boiler

The wall-mounted boiler heats the DHW after being enabled by the CD 60 control unit.
A contactor relay ⑮ enables the boiler, and in turn enables DHW cylinder temperature sensor ⑯ linked to the wall-mounted boiler.
As for central heating, the burner is enabled by external selection. In order to safeguard a DHW temperature above 45 °C even in dual alternative operation, DHW heating will be disabled or enabled via a fixed resistor ⑰ (2 kΩ). DHW heating is generally regulated by the CD 60 control unit. Accordingly, match-up the switching times for DHW heating between heat pump ① and the wall-mounted boiler. When DHW heating has been enabled, three-way changeover valve ⑦ is set to heating operation.

5862 241 GB

System version 9 (cont.) **Type AW**



Ⓐ Wall-mounted oil-/gas-fired boiler with weather-compensated control unit
Ⓑ Mixer circuit 1
Ⓒ Mixer circuit 2 (underfloor heating circuit)

RL Return
VL Flow

5862 241 GB

System version 9 (cont.) — Type AW

Required equipment

Item	Description	No.	Part no.
①	Heat pump Vitocal 300, type AW	1	see type plate
②	Temperature sensor to establish the temperature within the heating water buffer storage unit (top)	1	7159 671
③	Heating water buffer storage unit Vitocell 050, type SVP (600 or 900 litres capacity)	1	see type plate
④	DHW cylinder temperature sensor for measuring the DHW temperature (CD 60 control unit)	1	7159 671
⑤	Domestic hot water cylinder ■ Vitocell-B 100, type CVB (300 or 500 litres capacity) ■ Vitocell-B 300, type EVB (350 or 500 litres capacity)	1	see type plate
⑥	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
⑦	Three-way changeover valve central heating/DHW heating ■ up to 18.5 kW rated heat pump output ■ from 18.5 kW rated heat pump output	1	 7814 924 7165 482
⑧ ⑨	Modular-Divicon heating circuit distributor with ■ heating circuit pump, mixer circuit 1 ■ heating circuit pump, mixer circuit 2	1 each	see type plate
⑫	Temperature sensor to establish the temperature within the heating water buffer storage unit (bottom)	1	7159 671
⑱	Safety equipment block (equipped)	1	7143 779
⑲	Mixer motor, mixer circuit 1	1	7450 657
⑳	Mixer motor, mixer circuit 2	1	7450 657
㉑	Flow temperature sensor, mixer circuit 1	1	7450 642
㉒	Flow temperature sensor, mixer circuit 2	1	7450 642
㉓	Flow and return distributor for modular Divicon	1	7147 860
㉔	Overflow valve	2	9557 010
㉕	Electrical supplementary heating system ■ Immersion heater element EHO*1 (on-site control unit) ■ Direct DHW heater (for pre-heated water up to 50 °C)	1	 7265 198 on site

5862 241 GB

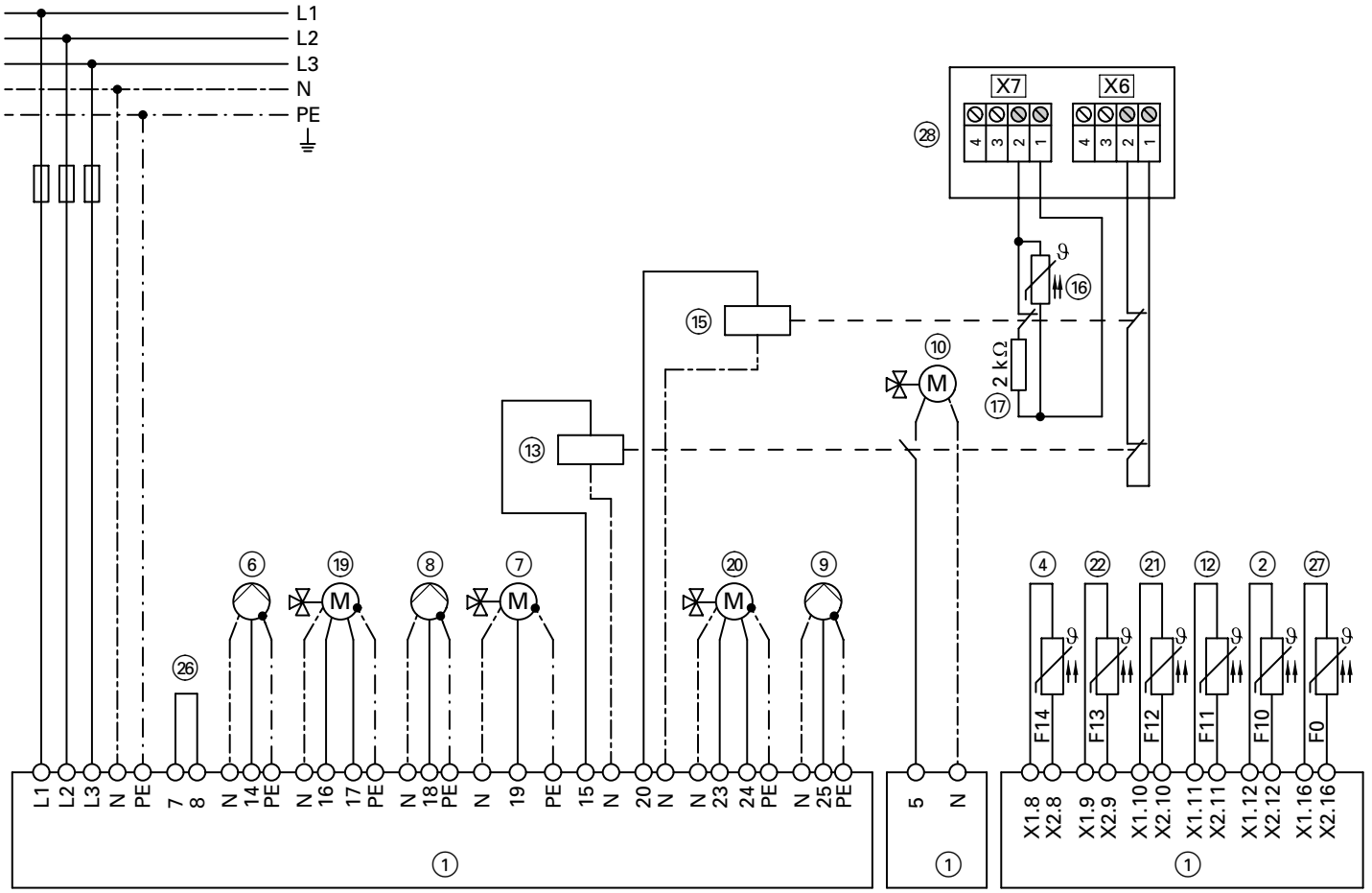
System version 9 (cont.) Type AW

Item	Description	Number	Part no.
	Central heating by the wall-mounted oil-/gas-fired boiler with weather-compensated control unit		
⑩	Three-way changeover valve central heating heat pump/central heating wall-mounted boiler	1	
	■ up to 18.5 kW rated output		7814 924
	■ from 18.5 kW rated output		7165 482
⑪	Low loss header	1	on site
⑬	Contactor relay for activating the three-way changeover valve and for enabling the wall-mounted boiler	1	7814 681
⑭	Cylinder temperature sensor used in the low loss header	1	7819 601
	DHW heating by the wall-mounted oil-/gas-fired boiler with weather-compensated control unit		
⑮	Contactor relay for activating DHW heating by wall-mounted boiler	1	7814 681
⑯	Cylinder temperature sensor for measuring the DHW temperature (wall-mounted boiler control unit)	1	7819 601
⑰	Fixed resistor 2 kΩ/0.25 W	1	on site

*[*1]Only in conjunction with Vitocell-B 100.*

System version 9 (cont.) — Type AW

Connection diagram



(26) Optional connection conversion kit EVU shutdown, part no. 7162 386
(27) Outside temperature sensor (CD 60 control unit)
(28) Wall-mounted oil-/gas-fired boiler with weather-compensated control unit

5862 241 GB

System version 10

Dual alternative operation with solid fuel boiler Vitolig 100

System definition

- Type AW: 127
- Type BW and WW
  - single stage: 27
  - two stage: 77

Primary circuit of the heat pump

If the actual temperature measured by the return temperature sensor in heat pump ① is lower than that set at the CD 60 control unit, heat pump ①, the primary pump, the intermediate circuit pump and secondary pump ② start to operate.

Secondary circuit of the heat pump

Heat pump ① supplies heat to the heating circuit.
The CD 60 control unit integrated into heat pump ① controls the heating water flow temperature and therefore the heating circuit.
Secondary pump ② channels the heating water via three-way changeover valve ③, either to DHW cylinder ④ or to heating water buffer storage unit ⑤ or into the heating circuits.
Heating circuit pumps ⑥ and ⑦ channel the required water volume into the heating circuits. The flow rate in the heating circuits is regulated

- by opening and closing the thermostatic radiator valves or the valves of the underfloor heating distributor and/or
- through an external heating circuit control unit.

Also, the flow rate can vary from that of the heat pump circuit (secondary pump ②) through sizing heating circuit pumps ⑥ and ⑦.
Recommendation: The sum total of volume flow of heating circuit pumps ⑥ and ⑦ should be less than the volume flow of secondary pump ②. Install a heating water buffer storage unit ⑤ parallel to the heating circuit in order to compensate for the difference between these water volumes. Heat not required by the heating circuits is stored in parallel in heating water buffer storage unit ⑤. This also provides a balanced heat pump operation (longer operating times).
Heat pump ① is switched off again, when the actual temperature measured by temperature sensor ⑧ of heating water buffer storage unit ⑤ has reached the temperature set at the CD 60 control unit. The heating circuit will then be supplied by heating water buffer storage unit ⑤.

5862 241 GB

System version 10 (cont.)

Only when the temperature at upper temperature sensor ⑨ of heating water buffer storage unit ⑤ falls below the set value will heat pump ① be started again. The heating circuit will be supplied with heat by heating water buffer storage unit ⑤ in case the electricity supplier shuts down the heat pump.

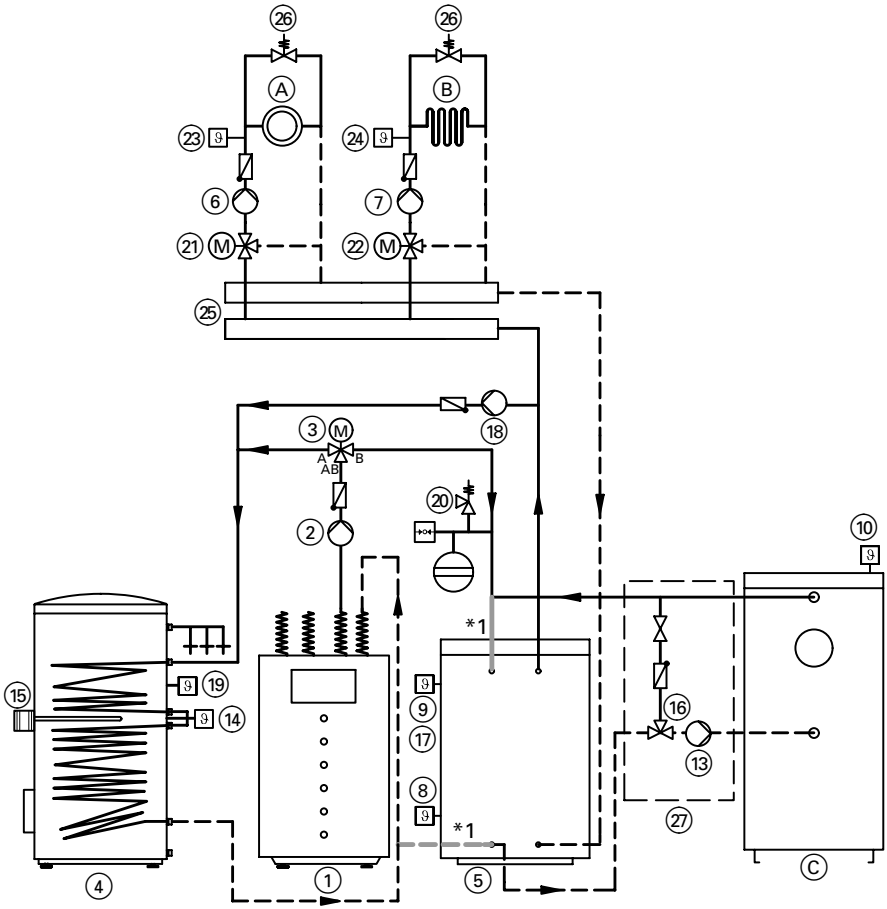
Central heating via solid fuel boiler
When the boiler water temperature of 60 °C set at minimum temperature thermostat ⑩ has been reached, heat pump ① will be switched off via contactor relay ⑪ and EVU contact ⑫ , and circulation pump ⑬ of solid fuel boiler Ⓑ will be started. This causes heating water buffer storage unit ⑤ to be heated with reference to the return temperature raising requirement. Heat consumers continue to be regulated by the CD 60 control unit.

DHW heating by heat pump
In the "as delivered condition", DHW heating by means of heat pump ① has priority over the heating circuit and is preferred during cheap tariff times, i.e. during the night.
Heating demand is communicated via DHW cylinder temperature sensor ⑭ and the control unit, which regulates three-way changeover valve ③. The CD 60 control unit raises the flow temperature to the value required for DHW heating.
The DHW can be further heated by an electric supplementary heating system ⑮ (e.g. immersion heater element EHO).
The CD 60 control unit switches the heating water flow to the heating circuit using three-way changeover valve ③, if the actual value measured at DHW temperature sensor ⑭ exceeds that set at the CD 60 control unit.

DHW heating by solid fuel boiler
If the boiler water temperature set at the solid fuel boiler control unit has been reached, thermostatically controlled valve ⑯ of the solid fuel boiler changes over, causing heating water buffer storage unit ⑤ to be heated. If the actual temperature at heating water buffer storage unit ⑤ reaches the temperature set at thermostat ⑰, circulation pump ⑱ starts to heat DHW cylinder ④, until the DHW temperature at cylinder thermostat ⑲ inside DHW cylinder ④ has reached 60 °C. Heat pump ① will be disabled for the purpose of heating DHW, if the actual DHW temperature at cylinder temperature sensor ⑭ has reached the temperature set at the CD 60 control unit.

5862 241 GB

System version 10 (cont.)



Ⓐ Mixer circuit 1
Ⓑ Mixer circuit 2 (underfloor heating circuit)
Ⓒ Solid fuel boiler Vitolig 100

RL Return
VL Flow

*1 *At least one size up (DN) from the remaining pipework.*

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System version 10 (cont.)

Required equipment

Item	Description	Number	Part no.
①	Heat pump Vitocal 300, type AW, BW and WW	1	see type plate
②	Secondary pump ■ Wilo RS 25-70R ■ Grundfos UPS 25-60	1	 7338 850 7338 851
③	Three-way changeover valve Central heating/DHW heating ■ up to 18.5 kW rated heat pump output ■ from 18.5 kW rated heat pump output	1	 7814 924 7165 482
④	Domestic hot water cylinder ■ Vitocell-B 100, type CVB (300 or 500 litres capacity) ■ Vitocell-B 300, type EVB (350 or 500 litres capacity)	1	see type plate
⑤	Heating water buffer storage unit Vitocell 050, type SVP (600 or 900 litres capacity)	1	see type plate
⑥ ⑦	Modular-Divicon heating circuit distributor with ■ heating circuit pump, mixer circuit 1 ■ heating circuit pump, mixer circuit 2	1 each	see type plate
⑧	Temperature sensor to establish the temperature within the heating water buffer storage unit (bottom)	1	7159 671
⑨	Temperature sensor to establish the temperature within the heating water buffer storage unit (top)	1	7159 671
⑩	Minimum temperature thermostat inside the solid fuel boiler	1	—
⑭	DHW cylinder temperature sensor for measuring the DHW temperature (CD 60 control unit)	1	7159 671
⑮	Electrical supplementary heating system ■ Immersion heater EHO*1 ■ Direct domestic hot water heater (for pre-heated water up to 50 °C)	1	 7265 198 on site
⑳	Safety equipment block (equipped)	1	7143 779

*1 *Only in conjunction with Vitocell-B 100.*

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System version 10 (cont.)

Item	Description	Number	Part no.
㉑	Mixer motor, mixer circuit 1	1	7450 657
㉒	Mixer motor, mixer circuit 2	1	7450 657
㉓	Flow temperature sensor, mixer circuit 1	1	7450 642
㉔	Flow temperature sensor, mixer circuit 2	1	7450 642
㉕	Flow and return distributor for modular Divicon	1	7147 860
㉖	Overflow valve	2	9557 010
	Central heating by solid fuel boiler Vitolig 100		
⑪	Contactor relay for switching the heat pump via EVU blocking contact	1	7814 681
㉗ ⑬ ⑯	Return temperature raising facility with ■ circulation pump ■ thermostatic control valve ■ check valve	1	7159 062
⑰	Thermostat inside the heating water buffer storage unit (top) for switching the circulation pump ⑱	1	7151 989
	DHW heating by solid fuel boiler Vitolig 100		
⑱	Circulation pump for DHW cylinder heating	1	on site
⑲	Cylinder thermostat inside the DHW cylinder for switching the circulation pump ⑱	1	7151 989

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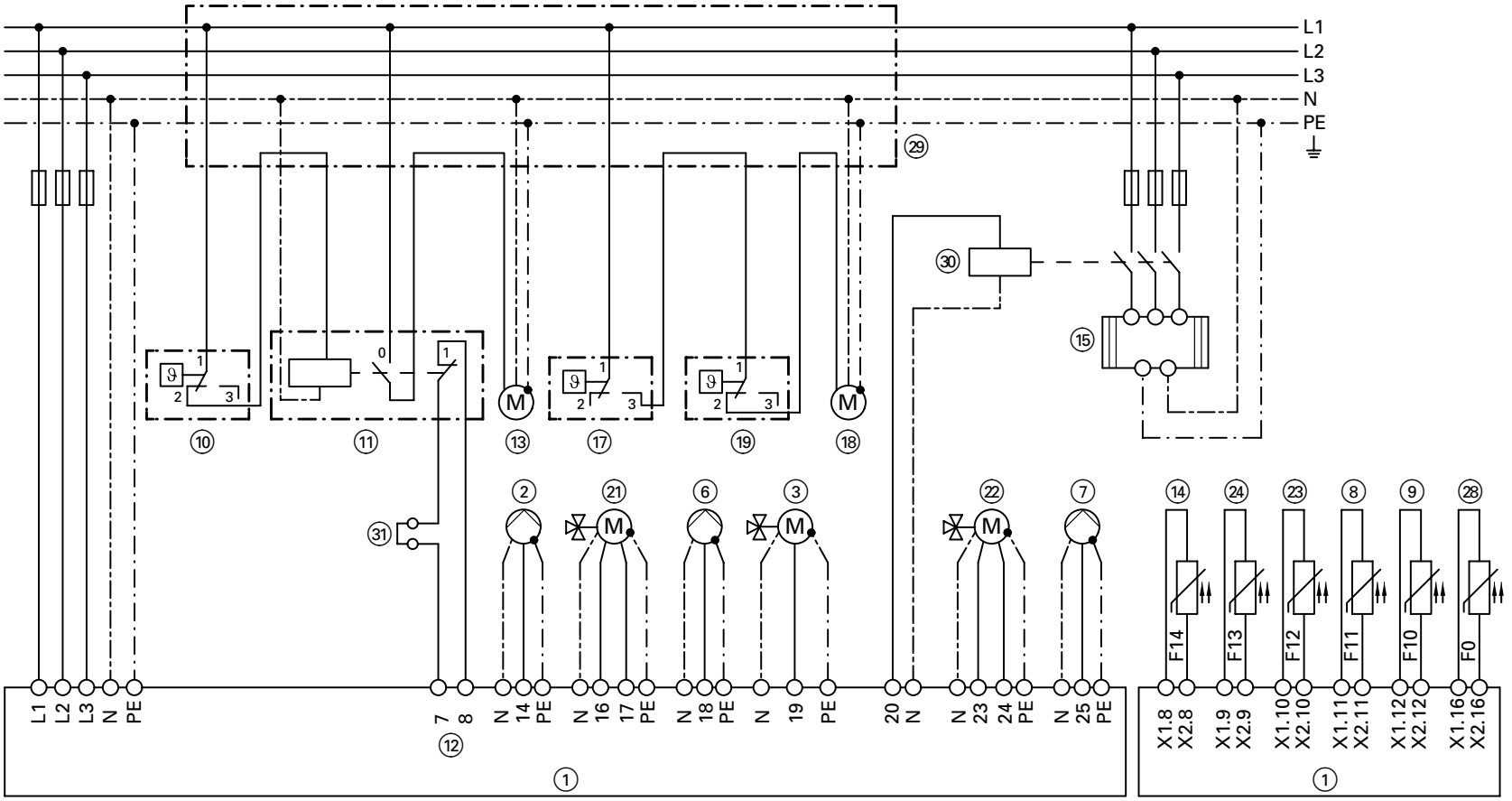
System version 10 (cont.)

System version 10 (cont.)

Connection diagram



⑫ EVU switch contact
㉘ Outside temperature sensor
㉙ Junction box (on site)
㉚ Contactor relay, part no. 7814 681, for activating the immersion heater element
㉛ Optional connection EVU blocking

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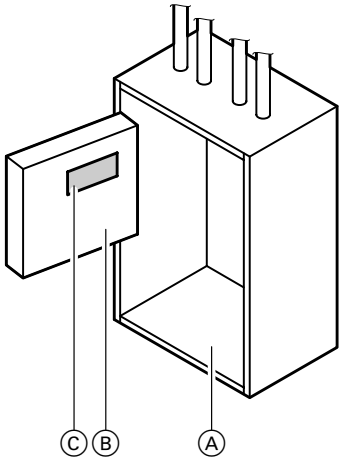
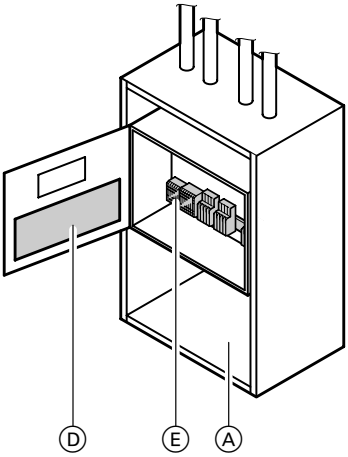
Summary



Ⓐ Open heat pump
Ⓑ Back of the pivoted control panel
Ⓒ PCB with terminal strip X1/X2
Ⓓ Electronics board
Ⓔ Heat pump terminal strip
(230/400 V connections inside the open control panel)

Connect the cables listed on the following pages to the matching terminals and secure cables to the cable harness.
Do not run control cables immediately next to 230/400 V cables.



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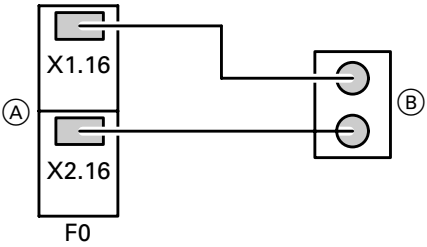
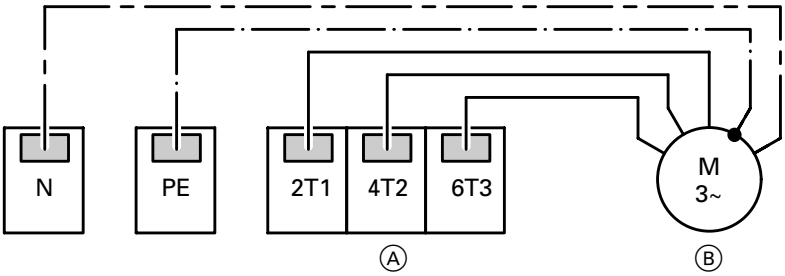
Outside temperature sensor



Install the outside temperature sensor on the north or north-west wall at a height of approx. 2.5 m; do not render over.
Cable:
$2 \times 0.5\ mm^2$, max. 50 m long, copper.
Cores may be interchanged.

Ⓐ Terminal strip X1/X2
Ⓑ Outside temperature sensor terminal strip

Primary pump/circulation pump for intermediate circuit



Ⓐ Motor protection switch terminals on the contactor in the control panel
Ⓑ Pump

Install the pump so that the junction box is located above the pump (water protection).

Motor protection relay F30: Primary pump (brine/groundwater)
Motor protection relay F32: Intermediate circuit pump
Cable: H05 W-F or H05 RN-F

⚠ ***Safety instructions***
*Do **not** interchange cores.*
Observe the rotational direction of the pump.

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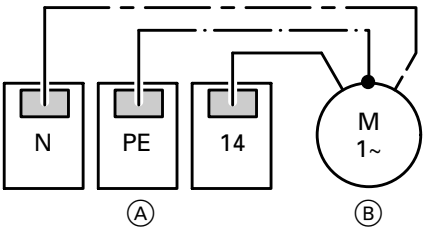
Heating circuit components

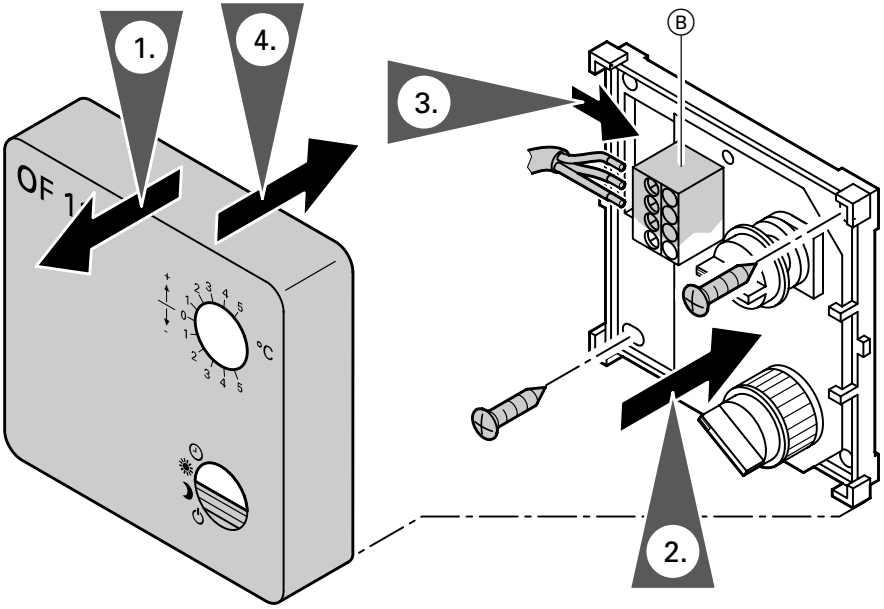
Secondary pump



Install the pump so that the junction box is located above the pump (water protection).

Ⓐ Terminal strip heat pump
Ⓑ Secondary pump

Remote controls



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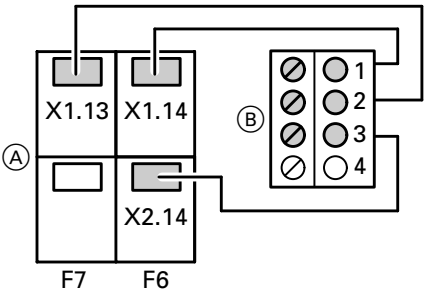
Heating circuit components (cont.)

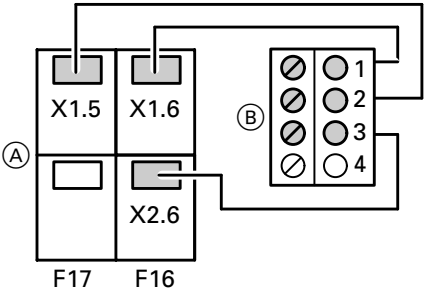
Remote control for mixer circuit 1



Install the remote control unit in accordance with standard practice.
Cable:
$3 \times 0.5\ mm^2$, max. 30 m long, copper.

⚠ ***Safety instructions***
*Do **not** interchange cores.*

Remote control for mixer circuit 2



Ⓐ Terminal strip X1/X2
Ⓑ Remote control terminal strip

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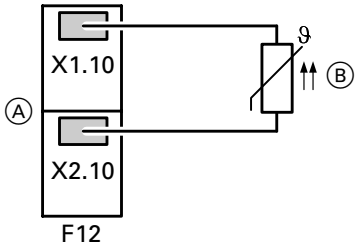
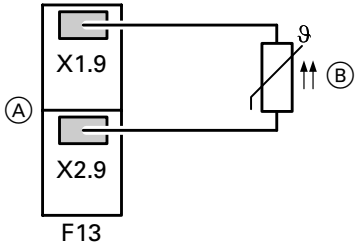
Heating circuit components (cont.)

Flow temperature sensors

Flow temperature sensor for mixer circuit 1



Flow temperature sensor for mixer circuit 2



Ⓐ Terminal strip X1/X2
Ⓑ Flow temperature sensor

Clean the heating flow pipe down to bare metal.

Install the flow temperature sensors as close as possible to the mixer.

Please note:
Use heat transfer paste.
Do not thermally insulate the sensors.

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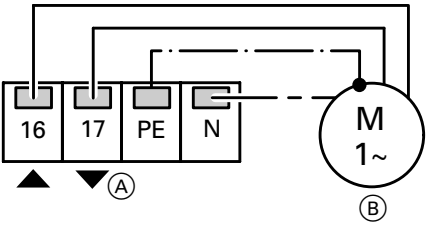
Heating circuit components (cont.)

Mixer motors

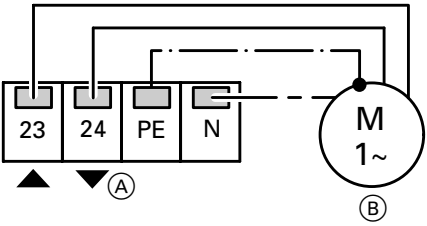
Mixer motor for mixer circuit 1



Install the mixer motor.

Installation instructions mixer motor

Mixer motor for mixer circuit 2

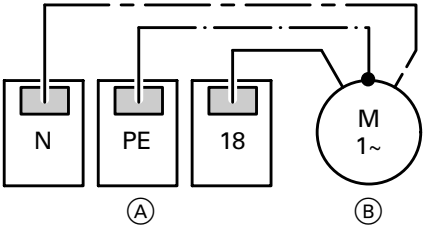


Ⓐ Terminal strip heat pump
▲ Open mixer
▼ Close mixer
Ⓑ Mixer motor

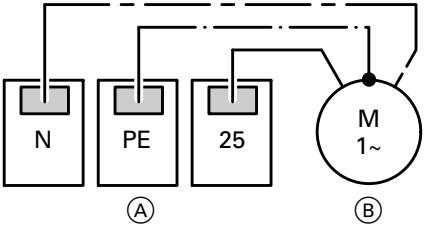
Heating circuit components (cont.)

Heating circuit pumps

Heating circuit pump for mixer circuit 1



Heating circuit pump for mixer circuit 2



Ⓐ Terminal strip heat pump
Ⓑ Heating circuit pump

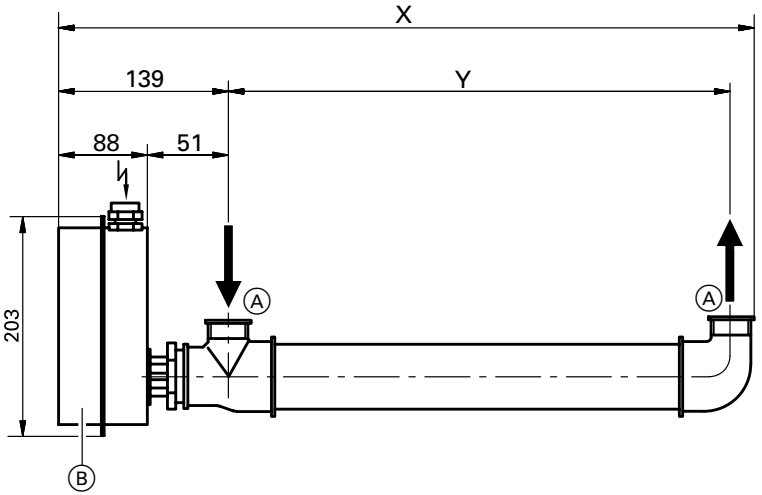
Install heating circuit pump (type tested).

Installation instructions heating circuit pump

Cable: H05 W-F
or
H05 RN-F

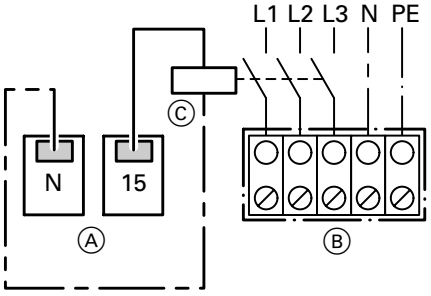
Heating circuit components (cont.)

Direct heating water heater



Ⓐ Connection, G1”
Ⓑ Front cover

Dimensions in mm	3 kW	6 kW
X	616	919
Y	480	780



Ⓐ Terminal strip heat pump
Ⓑ Direct heating water heater terminal strip
Ⓒ Contactor relay (on site)

Seal-in the heating flow of the direct heating water heater (may be installed vertically or horizontally)

Remove the front cover and make all necessary connections.

⚠ ***Safety instructions***
*Do **not** interchange cores.*

Set the thermostat (30 to 85 °C) in the direct water heater.

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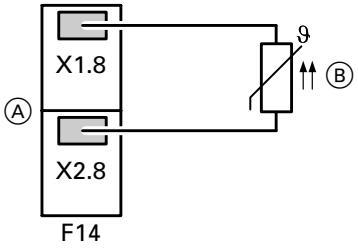
DHW heating components

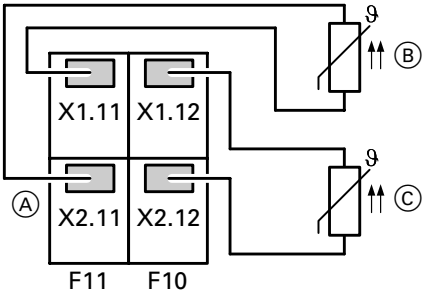
DHW cylinder temperature sensor

Domestic hot water cylinder



Ⓐ Terminal strip X1/X2
Ⓑ DHW cylinder temperature sensor

Heating water buffer storage unit



Ⓐ Terminal strip X1/X2
Ⓑ Lower DHW cylinder temperature sensor
Ⓒ Upper cylinder temperature sensor

Install
- immersion sensor inside
- contact sensor close to

DHW cylinder and/or heating water buffer storage unit.

Installation instructions DHW cylinder and/or the heating water buffer storage unit

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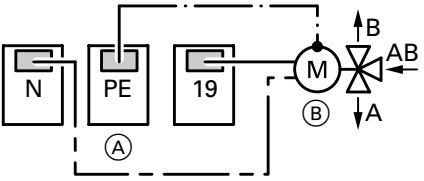
DHW heating components (cont.)

Three-way changeover valve

Three-way changeover valve with spring return

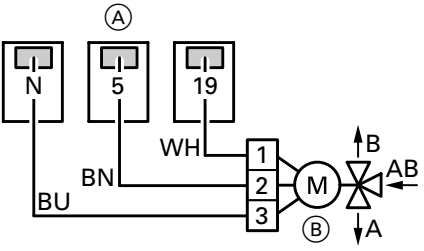


Install the three-way changeover valve in the flow.

Installation instructions three-way changeover valve

⚠ ***Safety instructions***
*Do **not** interchange cores.*

Three-way changeover valve of the Divicon heating circuit distributor, without spring return



Ⓐ Terminal strip heat pump
Ⓑ Three-way changeover valve
A to the domestic hot water cylinder
AB from the heat pump
B to the heating circuit

Colour coding conforming to DIN IEC 757
BN brown
BU blue
WH white

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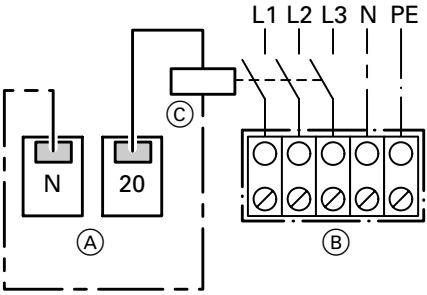
DHW heating components (cont.)

Immersion heater element EHO



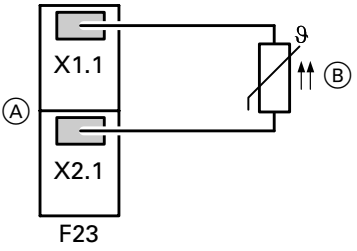
Ⓐ Heat pump terminal strip
Ⓑ Immersion heater element terminal strip
Ⓒ Contactor relay (on site)

Install the immersion heater element into the DHW cylinder.

Installation instructions immersion heater element

Solar heating system components

Collector temperature sensor

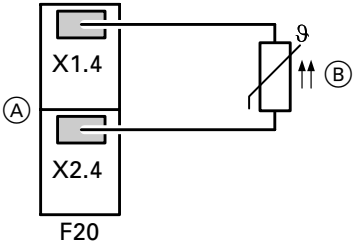


Installation instructions solar collector

Ⓐ Terminal strip X1/X2
Ⓑ Sensor

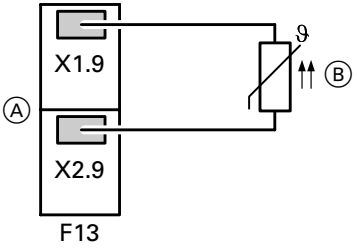
DHW cylinder temperature sensor

Heating water buffer storage unit



Installation instructions heating water buffer storage unit or DHW cylinder

Domestic hot water cylinder



Ⓐ Terminal strip X1/X2
Ⓑ Sensor

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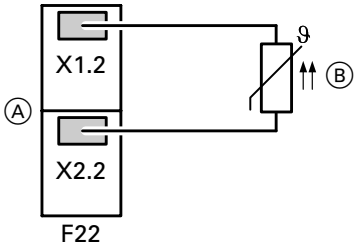
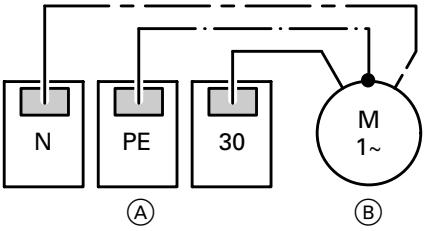
Solar heating system components (cont.)

Swimming pool sensor



Ⓐ Terminal strip X1/X2
Ⓑ Sensor

Solar heating circuit circulation pump



Install Solar-Divicon with circulation pump.

Installation instructions Solar-Divicon

⚠ ***Safety instructions***
*Do **not** interchange cores.*

Ⓐ Heat pump terminal strip
Ⓑ Circulation pump

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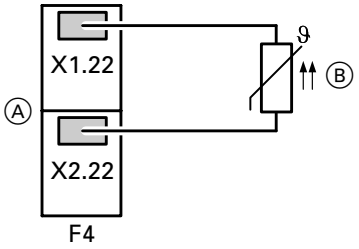
"Natural cooling" components

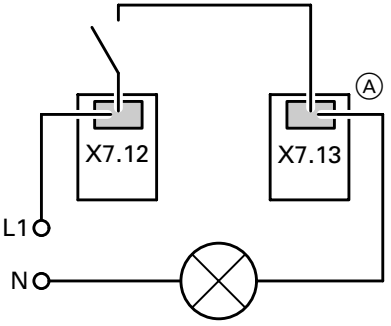
Dew point sensor



Ⓐ Terminal strip X1/X2
Ⓑ Dew point sensor

Flow temperature sensor,
see page 95.
Mixer motors, see page 96.
Circulation pumps, see page 97.

Central fault indication



Ⓐ Terminals X7 on the electronics board

Heat pump faults may be displayed optically.
Zero-volt contact
Load capacity: 230 V ~, 5 A

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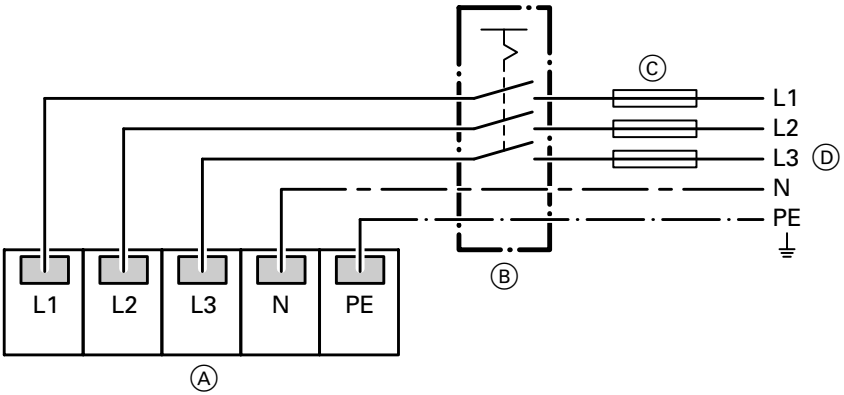
Mains electrical connection

⚠ ***Safety instructions***
Provide fuse protection in accordance with the max. value stated under Specification (see pages 213 to 224).
The mains electrical connections should correspond to current regulations and meet the requirements of your local electricity supply company.



Ⓐ Heat pump terminal strip
Ⓑ Mains isolator
Ⓒ Fuse
Ⓓ Mains voltage 3/N/PE ~ 400 V

1. Permanently connect the mains (3/N/PE ~ 400 V).
Cable: min. 5 × 2.5 mm^2

2. Route the mains cable from the rear into the heat pump and connect in accordance with the drawing shown.

⚠ ***Safety instructions***
*Do **not** interchange cores.*

Please note:
Heat pump, DHW cylinder and water pipes should be connected with the earth bonding of the house in question.

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Steps

For further instructions in connection with the individual steps see the respectively indicated page.

I	T	M		Page
I		M	**1. Keeping a service report**	108
I	T	M	**2. Switching off/disconnecting the main fuse**	
I	T	M	**3. Checking the refrigeration circuit for leaks**	108
I			**4. Filling the heating system**	109
I	T	M	**5. Checking the diaphragm expansion vessel and the system pressure**	109
I	T	M	**6. Checking the function of all safety valves**	
I	T	M	**7. Checking all water connections for leaks**	
I		M	**8. Checking the condensate drain connection**	110
I	T	M	**9. Filling the primary circuit and checking the pressure**	110
I			**10. Checking the connections at terminals 5 and 6**	
I			**11. Switching off the system On/Off switch**	
I			**12. Checking the security of electrical connections**	
I			**13. Connection cable – control unit/electronic board**	110
I			**14. Switching the compressor off**	110
		M	**15. Calibrating the collector temperature sensor**	111
I			**16. Activating the "Natural cooling" function**	112
I			**17. Activating the remote control**	112
I	T	M	**18. Switching on/connecting the main fuse**	
I			**19. Checking the input terminals and contactors**	112
I			**20. Setting the program selector to "⏻" (off)**	
I			**21. Implementing the installation program**	113
I			**22. Checking the sensor connections**	114
I			**23. Checking pumps and defrost valves**	114
I			**24. Checking the rotational direction of the mixer motor**	115

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Steps (cont.)

I = Initial start-up steps
T = Twice annual inspection steps
M = Maintenance steps

I	T	M		Page
I	T	M	**25. Checking the anti-freeze concentration in the brine circuit**	117
I	T	M	**26. Checking the anti-freeze thermostat**	117
I	T	M	**27. Checking the flow switch**	117
	T	M	**28. Cleaning the evaporator, weather grille and the condensate drain**	
	T	M	**29. Checking the frost protection sensor on the compressor**	
	T	M	**30. Re-tightening the screws on the solenoid valves**	
I			**31. Aligning the sensors**	118
I			**32. Connecting compressor 1 to terminal X8.2**	118
I			**33. Connecting compressor 2 to terminal X7.2**	118
I	T	M	**34. Checking the heating circuit flow rate**	119
I	T	M	**35. Checking the primary circuit flow rate**	119
I	T	M	**36. Checking the air flow**	120
I	T	M	**37. Checking the refrigerant circuit**	121
	T	M	**38. Checking the suction gas superheating**	121
	T	M	**39. Checking the condenser sludge level**	121
I	T	M	**40. Checking the HP control switch**	122
	T	M	**41. Checking the compressor housing temperature**	122
I			**42. Setting the control unit parameters**	122
I			**43. Commissioning the DHW cylinder system**	123
I			**44. Checking the DHW heating**	123
I			**45.Checking the refrigeration circuit for leaks (see 3.)**	
		M	**46. Repainting the bottom plate with rustproofing paint**	
I	T	M	**47. Checking the heat pump housing**	123
I			**48. Instructing the system user**	

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Further details to the individual steps

For initial start-up, inspection and maintenance work, remove
- *the front plate*
- *unscrew and open the control panel*
- *and close or re-install after completion.*

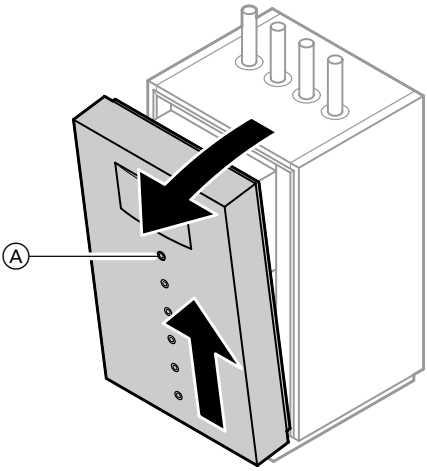
Observe the operating instructions during the initial start-up of the heat pump.

Keeping a service report

Enter the actual values to be established during the initial start-up and maintenance steps into the commissioning/service report.

Please note:
You will find these reports in the appendix.

Checking the refrigeration circuit for leaks



Check the heat pump interior with a refrigerant leak detector or leak detection spray for refrigerant leaks.

1. Remove the front panel:
   - open the lock Ⓐ,
   - pull the front plate up, and
   - lift the front plate out of the bottom retainer.
2. Immediately after removing the front plate, check the floor area for traces of refrigerant.
3. Check all fittings and soldered connections.

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Further details to the individual steps (cont.)

Filling the heating system

1. Open any installed non-return valves.
2. Check the inlet pressure of the diaphragm expansion vessel.
3. Thoroughly flush the heating system.
4. Fill the heating system with water and check the pressure.
5. Return the non-return valves into the operation position.

Checking the diaphragm expansion vessel and the system pressure

Carry out this test on a cold system.

1. Drain the primary side of the boiler system and reduce the pressure, until the pressure gauge indicates "0".
2. If the inlet pressure of the diaphragm expansion vessel is lower than the static system pressure, replenish with sufficient nitrogen to raise the inlet pressure above the static system pressure.

   Example

Static head (distance between boiler and highest heating surface) represents a static pressure of	10 m 1 bar

3. Re-fill with water, until the filling pressure is higher than the inlet pressure of the diaphragm expansion vessel.
   On a cold system the filling pressure must be approx. 0.2 bar higher than the static pressure. Max. operating pressure: 4 bar.
4. During the initial start-up, mark this value on the pressure gauge as minimum filling value.
   Only use anti-corrosion additives offered by the heating trade, which have been approved for heat pumps with DHW heating via single-walled heat exchangers (DHW cylinders).

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Further details to the individual steps (cont.)

Checking the condensate drain connection (type AW)

Check that condensate can freely drain. Pour water into the evaporator tray and observe it draining off.

Filling the primary circuit and checking the pressure (type BW)

1. Fill the primary circuit with heat transfer medium "Tyfocor -15 °C" and vent.

2. Check the primary circuit pressure.
   The pressure in the primary circuit should be approx. 2 bar.

3. Check and, if required, adjust the inlet pressure of the diaphragm expansion vessel.

Connection cable – control unit/electronics board

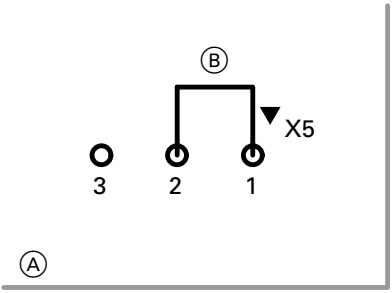
Check and, if required, plug in the connection cable (ribbon cable) from the programming unit to the electronics board. Always orient the plug on the l.h. side.

Switching the compressor off

Single stage heat pump
Disconnect the cable from terminal X8.2 (on the electronics board of the control unit)
or
Two stage heat pump
Disconnect the cables from terminals X8.2 and X7.2 (on the electronics board of the control unit).

Further details to the individual steps (cont.)

Calibrating the collector temperature sensor



Ⓐ Electronics board
Ⓑ Plug-in jumper X5

1. Switch off the mains voltage and open the heat pump.

2. Re-plug the jumper X5 from X5.1 and X5.2 to X5.2 and X5.3.

3. Close the heat pump and switch on the mains supply.

4. The collector temperature sensor must be connected to terminals X1.1 and X2.1.

- System parameters ..... B
- Tech. service level ..... E
- Enter code:
  SATAG .....

P	Q	R	S	T
A	B	C	D	E
P	Q	R	S	T
A	B	C	D	E
F	G	H	I	J

  press each 1 time.
- ..... 2 x OK
- Matching sensor temp. ..... B
- Select "F23 Solar collector" with ↓ and set to 69.3 °C with +0.1 and –0.1.
- save settings and exit menu ..... BACK

5. Switch off the mains voltage and open the heat pump.

6. Re-plug jumper X5 into positions X5.1 and X5.2.

7. Close the heat pump and switch on the mains supply.

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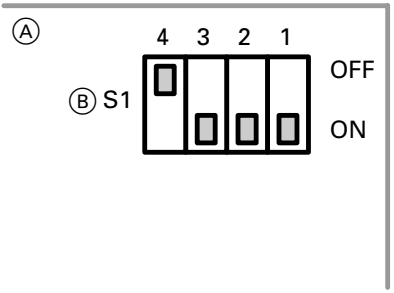
Further details to the individual steps (cont.)

Activating the "Natural cooling" function



1. Switch off the mains voltage and open the heat pump.

2. Set dip switches S1.1, S1.2 and S1.3 to "ON".

3. Close the heat pump and switch on the mains supply.

Ⓐ Electronics board
Ⓑ Dip switch block S1

Activating the remote control

The remote control may be allocated to

- *the heat pump circuit,*
- *to mixer circuit 1 or*
- *to mixer circuit 2.*

- Programming C
- Select the required heating circuit ..... A, B, ...
- Select "Select mode" with ↓ and select "Remote control" with >> and <<
- Save settings and exit menu ..... BACK

Checking the input terminals and contactors

Check the voltage and cycle at the mains connection, at the input terminals and at the contactors.
Voltage: 400 V 3 ~
Rotation: clockwise

Interchange phases L1 and L3, if the phase symmetry fault lamp on the phase failure relay illuminates.

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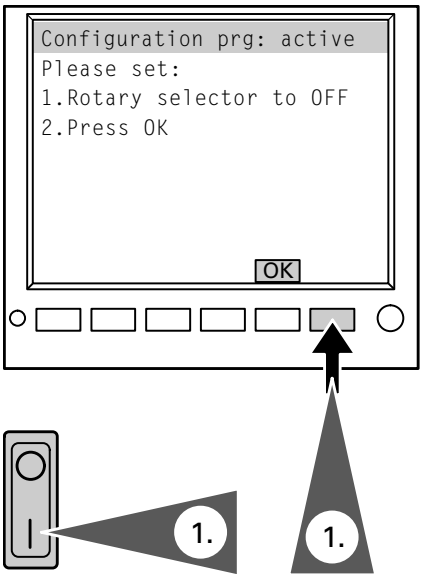
Further details to the individual steps (cont.)

Implementing the installation program

You will find a comprehensive description relating to all control settings in chapter "Additional information".



1. Press and hold the r.h. key of the control unit down, and switch on the system On/Off switch. Release the button.
   The installation program will then start.

2. Select the required language.

3. **Check the sensor temperatures**
   Check the sensor connection if unrealistic values are indicated.
   You reach the next program item by pressing key **BACK**.

4. **Carry out a relay test**
   Switch the highlighted relay with keys **ON** and **OFF**.
   Key **ALL** switches all relays off.
   You reach the next program item by pressing key **BACK**.
   The building heating system remains off.

5. **Set the date and time**
   Change the highlighted numerical value with keys **+** and **−**.
   Pressing **BACK** prevents the settings from being saved, but starts the next program item instead.
   Pressing **OK** saves the settings and the next program item is started.

6. **Implement system definition**
   For implementation and table, see chapter "Control unit settings".

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Further details to the individual steps (cont.)

Checking the sensor connections

Check, whether all sensors have been connected as per connection diagram. To do this, scan "Sensor temperatures".

Operating instructions

Checking pumps and defrost valves

1. Check all connections using the connection diagram.

2. Only for heat pump BW:
   Circulation in the primary or intermediate circuit is ensured, if the temperature differential ΔT = 0 K between the primary flow and primary return and is not identical with the room temperature (check by carrying out a relay test, see page 130).

3. Only for heat pump AW:
   Check the rotational direction of the fan.
   Air must stream from top to bottom.

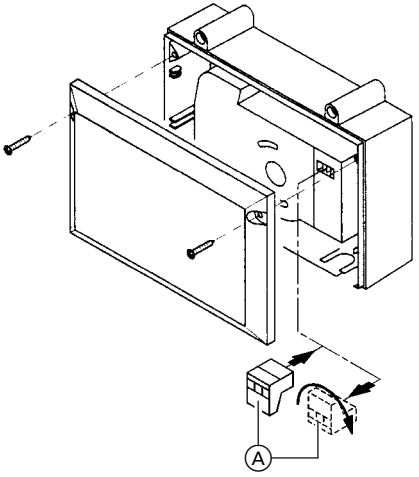
4. Circulation in the heat pump circuit is ensured, if the temperature differential ΔT = 0 K between the heating flow and heating return is not identical with the room temperature at the place of installation.

   Please note
   In systems with a heating water buffer storage unit, the heating flow and heating return temperatures are identical with the buffer storage temperature.

Further details to the individual steps (cont.)

Checking the rotational direction of the mixer motor

Mixer motor for Viessmann mixers DN 20 to 50 (welded version – part no. 7450 657, accessory)

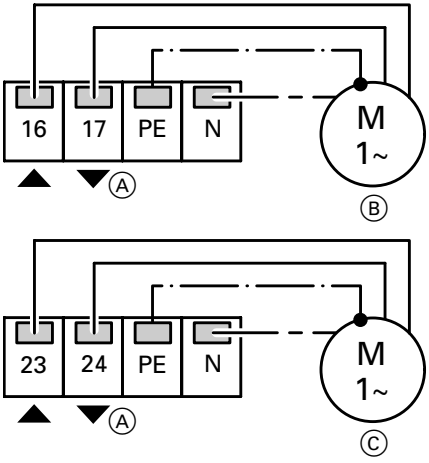


Ⓐ Plug-in connection inside the mixer motor

Change the rotational direction by turning the plug-in connector 180°.

- Test:
  When carrying out a relay test of the control unit (see page 130), the mixer is set to "Open" and "Close".
- Manual mixer adjustment: Lift and disengage the mixer handle.

Rated voltage:	*230 V~*
Rated frequency :	*50 Hz*
Power consumption:	*4 W*
Protection level:	*IP 32 acc. to EN 60529*
Torque:	*3 Nm*
Operating time for 90° ⊀:	*120 s*



Ⓐ Terminal strip heat pump
▲ Open mixer
▼ Close mixer
Ⓑ Mixer motor 1
Ⓒ Mixer motor 2

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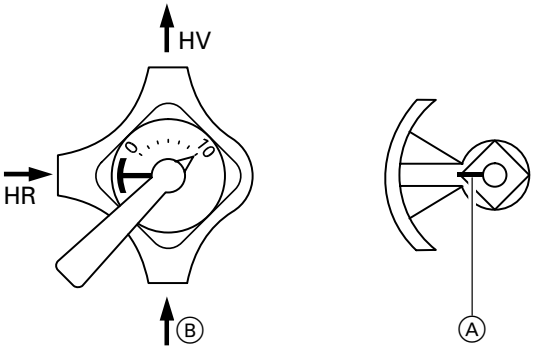
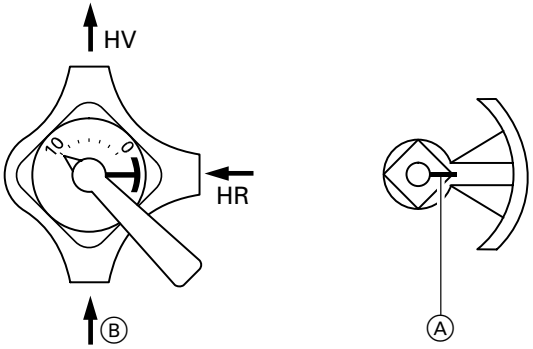
Further details to the individual steps (cont.)

Installation examples

In the "**as delivered condition**", the electrical mixer motor connection is adapted for the following installation example; leave unchanged.



For this installation example, turn the mixer motor plug-in connector 180°.



Ⓐ Marker notch
Ⓑ Heat pump flow
HR Heating return
HV Heating flow

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Further details to the individual steps (cont.)

Checking the anti-freeze concentration in the brine circuit (type BW)

1. Check and record the anti-freeze concentration.
   You will find reports in the appendix.
2. During commissioning, set the frost protection thermostat 2 K lower for water/water heat pumps with intermediate circuit (1 full turn anti-clockwise).

Checking the frost protection thermostat (type WW)

1. Set the frost protection thermostat to 3.5 °C.
2. Start the heat pump.
   At a primary outlet temperature of 3 to 4 °C (for intermediate circuits, 1 to 2 °C), the heat pump must switch off.
3. To this effect, choke the water inlet volume.
   At water inlet temperatures (primary flow) above +9 °C, the flow switch will stop the heat pump earlier than the frost protection thermostat.

Checking the flow switch (type WW)

1. Stop the primary pump (submersible pump) or the intermediate circuit pump by carrying out a relay test (see page130).
   The control unit display should indicate fault "A03", when the primary pump (submersible pump) or the intermediate circuit pump have been stopped and the control unit is set to heating mode.
   230 V~ must be indicated between terminals "0" and "5"; between terminals "0" and "6" only, if the flow switch has closed.
   The flow switch must switch off below 50 to 60 % of the set water volume.
2. Start the primary pump (submersible pump) or the intermediate circuit pump.

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Further details to the individual steps (cont.)

Matching sensors

Compare the temperatures displayed on the control unit with actual temperatures and correct if required.

Measure actual temperatures with thermometers and heat transfer paste. During these tests, liquid must circulate through these pipes.
You will find a comprehensive description relating to the function "Matching sensor temp." in chapter "Control unit settings".

Connecting compressor 1 to terminal X8.2

1. Connect cables to terminal X8.2.
2. Set the program selector to "✋" (manual mode).
3. Wait until the first compressor starts (after approx. 15 minutes).
4. Check by hand, whether the heating flow warms up and whether a difference in temperatures develops between the primary flow and return.

Connecting compressor 2 to terminal X7.2 (if installed)

1. Connect cables to terminal X7.2.
2. Set the program selector to "☀" (standard mode) and increase the set room temperature using the rotary selector "Standard temperature".
3. Wait until the second compressor starts.

Further details to the individual steps (cont.)

Checking the heating circuit flow rate

1. Establish the temperature differential between the heating flow and return.

2. Determine and enter the actual values and test conditions in accordance with the commissioning/service report in the appendix.

3. The flow rate is too low if the temp. difference ΔT is greater than the set value entered in the commissioning/ service report. Then:
   - vent the heating circuits,
   - increase the speed of the secondary pump and that of the heating circuit pump.

Set values

ΔT: 8 to 12 K at 35 °C heating flow and 10 °C ventilation air, brine and water inlet temperature

ΔT: 6 to 10 K at 35 °C heating flow and 0 °C ventilation air, brine and water inlet temperature

Checking the primary circuit flow rate (type BW and WW)

1. Establish the temperature differential between primary flow and return. *Carry out this test for the ground-water circuit or the brine circuit (possibly intermediate circuit) subect to the respective heat pump type.*

2. Determine and enter actual values and test conditions in accordance with the commissioning/service report in the appendix.

3. The flow rate is too low if the temp. difference ΔT is greater than the set value entered in the commissioning/ service report. Then:
   - Change the rotational direction of the pump
     or
   - use a larger pump.

Set values
for type BW:

ΔT: 3 to 5 K at 35 °C heating flow and 10 °C set inlet temperature

ΔT: 2 to 4 K at 35 °C heating flow and 0 °C set inlet temperature

for type WW:

ΔT: 3 to 5 K at 35 °C heating flow and 10 °C water inlet temperature

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Further details to the individual steps (cont.)

Checking the air flow rate (type AW)

1. Determine the temperature difference ΔT between the air inlet and air outlet.

2. Determine and enter the actual values and test conditions in accordance with the commissioning/service report in the appendix.

3. The air flow rate is too low, if the temperature difference ΔT is greater than the set values. In that case, either the air channels are too small or too long (pressure drop too great) or are blocked by some obstacle.

Set values
for type AW106:
⊿T: max. 4.5 K at 35 °C heating flow and 10 °C ventilation air temperature
⊿T: max. 3.5 K at 35 °C heating flow and 0 °C ventilation air temperature
for type AW108/110:
⊿T: max. 6 K at 35 °C heating flow and 10 °C ventilation air temperature
⊿T: max. 4.5 K at 35 °C heating flow and 0 °C ventilation air temperature
for type AW113:
⊿T: max. 10 K at 35 °C heating flow and 10 °C ventilation air temperature
⊿T: max. 7 K at 35 °C heating flow and 0 °C ventilation air temperature
for type AW116:
⊿T: max. 11.5 K at 35 °C heating flow and 10 °C ventilation air temperature
⊿T: max. 8.5 K at 35 °C heating flow and 0 °C ventilation air temperature

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Further details to the individual steps (cont.)

Checking the refrigerant circuit

⚠ ***Safety instructions***
This work may only be carried out by a refrigeration engineer.

1. Observe the sight glass in each refrigeration circuit:
Bubbles > 5 mm should not be visible, when the heating flow has stabilised at 35 °C.
If larger bubbles are visible, search and repair the leak in the respective stage, and refill with refrigerant.

2. Check the humidity indicators on the sight glasses. The refrigerant circuit has a leak if these indicate a high level of humidity.

Checking the suction gas superheating

⚠ ***Safety instructions***
This work may only be carried out by a refrigeration engineer.

1. Check and, if required, adjust the suction gas superheating for each compressor.

2. Enter all actual values into the commissioning/service report in the appendix.

Checking the condenser sludge level

⚠ ***Safety instructions***
This work may only be carried out by a refrigeration engineer.

1. Determine actual values.

2. Enter all actual values into the commissioning/service report in the appendix.

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Further details to the individual steps (cont.)

Checking the HP control switch

Deliberately choke the heating flow, until the flow temperature rises above 55 °C (but no higher than 75 °C).
Each compressor should be stopped by its HP control switch.

The HP control switch has no reset button.
For more rapid cooling of the second compressor, the three-way change-over valve can be opened manually or the defrost valve (K12) can be briefly started by a relay test (see page 130).

Checking the compressor housing temperature

1. Switch on the heat pump and operate for at least 10 min.
2. Measure the outside temperature of the compressor housing, while it is in operation.

The ouside of the housing must neither ice up, nor should it reach temperatures higher than 60 °C (check with your local refrigeration specialist).

Setting the control unit parameters

You should activate "Service level" at the control unit, to be able to adjust the control parameters.
You will find information on the subject of "Service level" and regarding the adjustment of control parameters in the "Control unit settings" chapter. Adjust the curve in accordance with the design temperature and your local climatic zone.

1. Check the control unit settings using the table of standard settings and enter any changed values into the commissioning/ service report in the appendix.
2. Check the set heat pump start delay.
3. Delete all fault messages.

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Further details to the individual steps (cont.)

Commissioning the DHW cylinder system

Fill the domestic hot water cylinder.

Please note:
No further settings are required for the operation of the DHW cylinder, if the system is correctly set up.
At the control unit, cylinder temperature, switching times, operating mode, etc., can be set to the individual user requirements.
You will find the required steps for setting the control unit under "Control unit settings".

Checking the DHW heating

1. Measure the actual temperature on the heating flow and return as well as on the DHW cylinder.
2. Enter all actual values into the commissioning/service report in the appendix.

Checking the heat pump housing

Seal any holes that might have been drilled into the housing (cable ways) with permanently flexible sealant, to prevent condensation forming in the heat pump interior.

Please note
The cold pipes in the interior are deliberately left without insulation to be able to utilise all waste heat (e.g. from the compressor).

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Diagnostic table

Fault message in the display field	Cause of fault	Check
A02 Power failure (phase reversal)	Faulty or disconnected fuse	Check the mains supply phases L1, L2, L3 and activate/replace the fuse, if required
	Phases interchanged in the mains supply cable	Interchange phases L1 and L3; clockwise rotation required
	Mains fault; voltage fluctuations	Notify your electricity supplier
A03 Brine pressure or flow switch	Type BW: Brine pressure too low	Increase the pressure in the primary circuit
	The pressure switch has activated (flow rate too low)	Primary pumps: Check the circulation pump for the brine circuit or the submersible pump
A04 Electricity block (status message)	The electricity supplier has blocked the supply of power	The heat pump starts up automatically as soon as the block is removed
A05 Thermal overload relay – primary pump or Klixon fan	Type AW: Klixon fan has activated	Wait until the heat pump is switched on again and check whether the ventilator is operating
	Type BW: Thermal overload relay – primary pump has activated	Check settings, implement a reset, check connections, measure the winding resistance, check the primary pump
A06 Safety HP compressor 1	Safety HP switch has activated	Remove the cause for HP and press the reset button on the HP safety switch

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Diagnostic table (cont.)

Fault message in the display field	Cause of fault	Check
A07 LP compressor 1	Type AW: Air duct clogged	Clean the air duct
	Type BW: Primary circuit leaking or faulty primary pump	Check the pressure gauge or the primary pump, check shut-off equipment
	Intermediate circuit leaking or faulty intermediate circulation pump	Check pressure gauge and intermediate circuit pump
A08 Controlled HP compressor 1	Air inside the heating circuit	Vent the heating circuit
	Secondary pump or heating circuit pump stalled	Check secondary pump or heating circuit pump
	Heating circuit contaminated	Flush the heating circuit
A09 Thermal overload relay compressor 1	Thermal overload relay – compressor 1 has activated	Check settings, implement a reset, check connection, measure the winding resistance
A10 Frost protection or gas pressure switch stage 1	Type AW: Gas pressure switch compressor 1	Wait, until the heat pump restarts
	Type BW: Frost protection compressor 1	Wait until the heat pump restarts; check water volume and temperature
A11 Safety HP compressor 2	HP safety switch has activated	Remove the cause for HP and press the reset button on the HP safety switch

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Diagnostic table (cont.)

Fault message in the display field	Cause of fault	Check
A12 LP compressor 2	Type AW: Air duct clogged	Clean the air duct
	Type BW: Primary circuit leaking or faulty primary pump or	Check the pressure gauge and the primary pump, check shut-off equipment
	Intermediate circuit leaks or intermediate circuit pump faulty	Check pressure gauge and intermediate circulation pump
A13 Controlled HP compressor 2	Air inside the heating circuit	Vent the heating circuit
	Secondary pump or heating circuit pump stalled	Check secondary pump or heating circuit pump
	Heating circuit contaminated	Flush the heating circuit
A14 Thermal overload relay compressor 2	Thermal overload relay compressor 2 has activated	Check settings, implement a reset, check connection, measure the winding resistance
A15 Frost protection or gas pressure switch compressor 2	Type AW: Gas pressure switch compressor 2	Wait, until the heat pump restarts
	Type BW: Frost protection thermostat compressor 2	Wait until the heat pump restarts; check water volume

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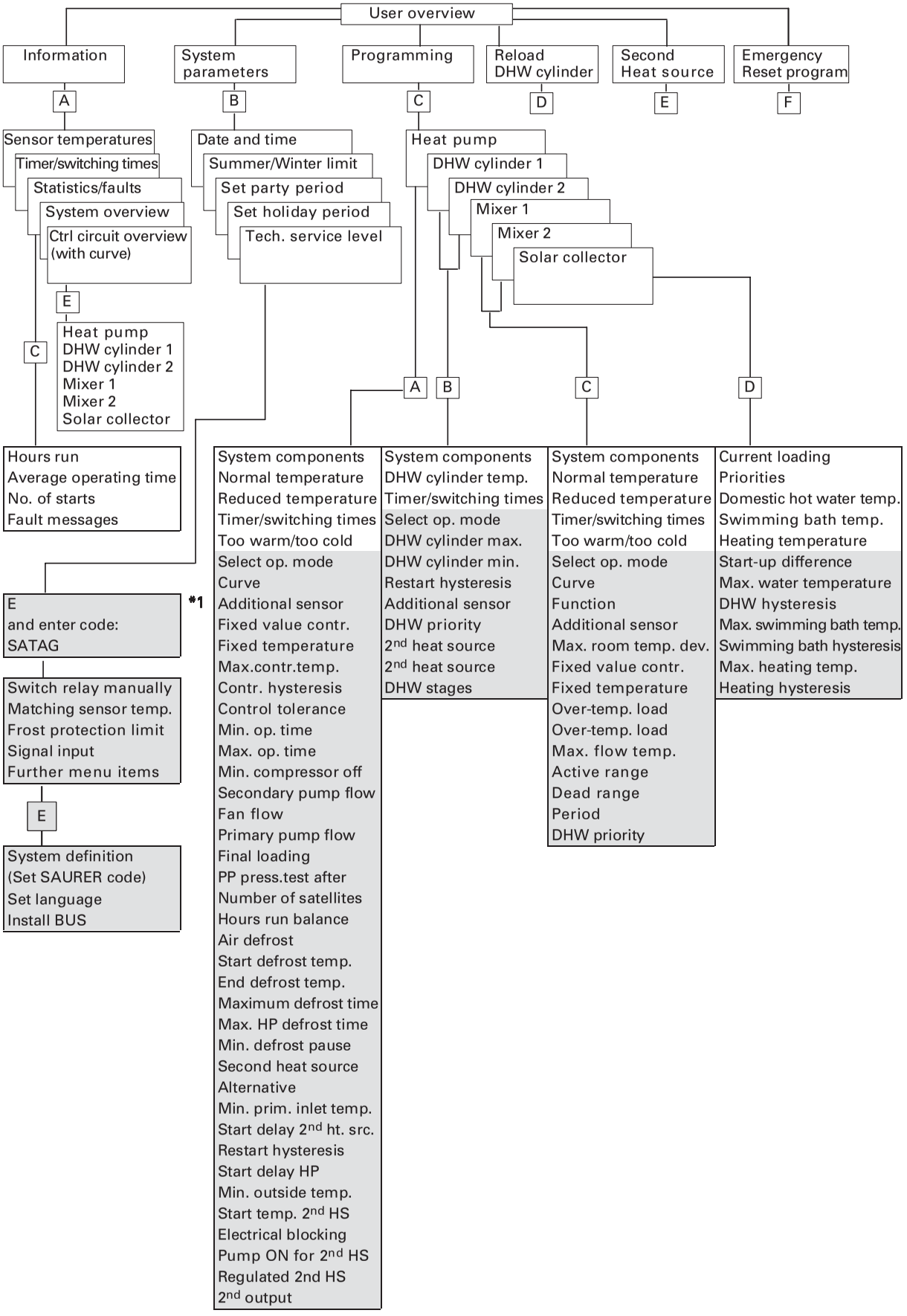
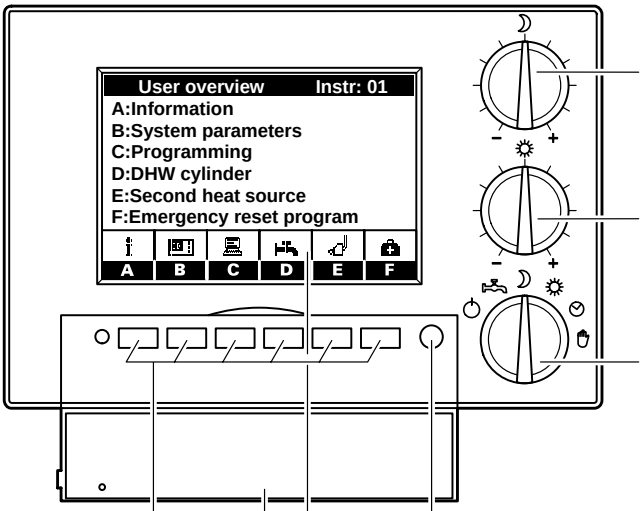


*1 *All menus with grey highlights will only be displayed after the specialist level has been activated (see page 130).*

General overview



◗ Rotary selector "Reduced room temperature"

☼ Rotary selector "Standard room temperature"

Operating mode selector

Help key

Display field

Operating unit flap

Menu keys

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Activating the technical service level

Only *those settings are described on the following pages, which are the* ***exclusive*** *domain of specialists operating at the technical service level. A code must be entered to access this level.*

Please note:

Incorrect operation at the technical service level by system users will invalidate the warranty.

Menu item — Key

- System parameters ..... B
- Tech. service level ..... E
- Enter code:

  SATAG ..... P Q R S T / A B C D E / P Q R S T / A B C D E / F G H I J

  press each 1 time
- ..... 2 x OK

By activating the technical service level, the menus "Heat pump", DHW cylinder", "Mixer" etc. in the main menu "Programming" will also expand.
These additional functions will be described on the following pages.

Implementing a relay test

The relay test enables all connected devices to be manually switched on and off for the purpose of commissioning or testing.

Menu item — Key

- System parameters ..... B
- Tech. service level ..... E
- Switch relay manually ..... A

Select a relay by pressing keys ↑ and ↓, and switch the relay with keys ON and OFF.
Key ALL switches all devices off.

- Exit menu ..... BACK

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Matching sensor temperatures

This function enables sensor deviations caused by cable resistance to be compensated or corrected.
Sensors need to be calibrated once.
Data is stored even during power failures.

Menu item	Key
■ System parameters	B
■ Tech. service level	E
■ Matching sensor temp.	B

Enter the actual temperature measured for each sensor.
Pressing **BACK** reverses the settings entered for the highlighted sensor.

■ Save settings and exit menu ..... **BACK**

Setting the frost protection limit

The frost protection of the heating system will be activated as soon as the outside temperature, averaged over a period of six hours, falls below the set temperature value.
System characteristics during frost protection:
The secondary pump and/or the heating circuit pumps operate. The mixers open the heating circuits, if the flow temperature falls below 20 °C.

Menu item	Key
■ System parameters	B
■ Tech. service level	E
■ Frost protection limit	C

Change the temperature value by pressing **+0.5>** and **–0.5>**.

■ Save settings and exit menu ..... **OK**

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Checking signal inputs

Using this menu, you can regulate the system and check, in case of faults, whether the cause of the fault has been eliminated.
In standard mode, the digital monitoring inputs are pulled "low". They go "high" if faults occur. A changeover to "high" is stored and displayed in the "Information"-"Statistic/Faults" menu.

Menu item	Key
■ System parameters	B
■ Tech. service level	E
■ Signal inputs	D

Scroll through the list by pressing ↑ and ↓.

■ Exit menu ..... BACK

Implementing a system definition

The system type is set in this menu. To access this function, enter the code "SAURER".
Select a system from the following tables.

Menu item	Key
■ System parameters	B
■ Tech. service level	E
■ Further menu items	E
■ System definition	A
■ Safety scan	OK

The "heating water buffer storage units" listed in the system definition are referred to in the control unit display as "const. temp. storage".

Modify the system number in single steps by pressing + and −.
Modify the system number in steps of 10 by pressing >> and <<.

■ Save settings and exit menu ..... OK

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Implementing a system definition (cont.)

No.	Type	No. of stages	System
0	BW	1	Modulating system
1	BW	1	Modulating system, DHW cylinder 1
2	BW	1	Modulating system, DHW cylinder 1, DHW cylinder 2
5	BW	1	Modulating system, solar heating system
6	BW	1	Modulating system, DHW cylinder 1, solar heating system
7	BW	1	Modulating system, DHW cylinder 1, DHW cylinder 2, solar heating system
10	BW	1	De-coupled modulating storage unit
11	BW	1	De-coupled modulating storage unit, DHW cylinder 1
12	BW	1	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2
15	BW	1	De-coupled modulating storage unit, solar heating system
16	BW	1	De-coupled modulating storage unit, DHW cylinder 1, solar heating system
17	BW	1	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2, solar heating system
20	BW	1	Heating water buffer storage unit
21	BW	1	Heating water buffer storage unit, DHW cylinder 1
22	BW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2
23	BW	1	Heating water buffer storage unit, mixer circuit 1
24	BW	1	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1
25	BW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1
26	BW	1	Heating water buffer storage unit, mixer circuit 1, mixer circuit 2
27	BW	1	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1, mixer circuit 2
28	BW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1, mixer circuit 2
30	BW	1	Heating water buffer storage unit, solar heating system

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Implementing a system definition (cont.)

No.	Type	No. of stages	System
31	BW	1	Heating water buffer storage unit, DHW cylinder 1, solar heating system
32	BW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, solar heating system
33	BW	1	Heating water buffer storage unit, mixer circuit 1, solar heating system
34	BW	1	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1, solar heating system
35	BW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1, solar heating system
40	BW	1	External control 1
41	BW	1	External control 1, DHW cylinder 1
42	BW	1	External control 1, DHW cylinder 1, DHW cylinder 2
50	BW	2	Modulating system
51	BW	2	Modulating system, DHW cylinder 1
52	BW	2	Modulating system, DHW cylinder 1, DHW cylinder 2
55	BW	2	Modulating system, solar heating system
56	BW	2	Modulating system, DHW cylinder 1, solar heating system
57	BW	2	Modulating system, DHW cylinder 1, DHW cylinder 2, solar heating system
60	BW	2	De-coupled modulating storage unit
61	BW	2	De-coupled modulating storage unit, DHW cylinder 1
62	BW	2	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2
65	BW	2	De-coupled modulating storage unit, solar heating system
66	BW	2	De-coupled modulating storage unit, DHW cylinder 1, solar heating system
67	BW	2	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2, solar heating system
70	BW	2	Heating water buffer storage unit
71	BW	2	Heating water buffer storage unit, DHW cylinder 1
72	BW	2	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2
73	BW	2	Heating water buffer storage unit, mixer circuit 1

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Implementing a system definition (cont.)

No.	Type	Number of stages	System
74	BW	2	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1
75	BW	2	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1
76	BW	2	Heating water buffer storage unit, mixer circuit 1, mixer circuit 2
77	BW	2	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1, mixer circuit 2
78	BW	2	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1, mixer circuit 2
80	BW	2	Heating water buffer storage unit, solar heating system
81	BW	2	Heating water buffer storage unit, DHW cylinder 1, solar heating system
82	BW	2	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, solar heating system
83	BW	2	Heating water buffer storage unit, mixer circuit 1, solar heating system
84	BW	2	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1, solar heating system
85	BW	2	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1, solar heating system
90	BW	2	External control 1, external control 2
91	BW	2	External control 1, external control 2, DHW cylinder 1
92	BW	2	External control 1, external control 2, DHW cylinder 1, DHW cylinder 2
100	AW	1	Modulating system
101	AW	1	Modulating system, DHW cylinder 1
102	AW	1	Modulating system, DHW cylinder 1, DHW cylinder 2
105	AW	1	Modulating system, solar heating system
106	AW	1	Modulating system, DHW cylinder 1, solar heating system
107	AW	1	Modulating system, DHW cylinder 1, DHW cylinder 2, solar heating system
110	AW	1	De-coupled modulating storage unit
111	AW	1	De-coupled modulating storage unit, DHW cylinder 1

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Implementing a system definition (cont.)

No.	Type	No. of stages	System
112	AW	1	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2
115	AW	1	De-coupled modulating storage unit, solar heating system
116	AW	1	De-coupled modulating storage unit, DHW cylinder 1, solar heating system
117	AW	1	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2, solar heating system
120	AW	1	Heating water buffer storage unit
121	AW	1	Heating water buffer storage unit, DHW cylinder 1
122	AW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2
123	AW	1	Heating water buffer storage unit, mixer circuit 1
124	AW	1	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1
125	AW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1
126	AW	1	Heating water buffer storage unit, mixer circuit 1, mixer circuit 2
127	AW	1	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1, mixer circuit 2
128	AW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1, mixer circuit 2
130	AW	1	Heating water buffer storage unit, solar heating system
131	AW	1	Heating water buffer storage unit, DHW cylinder 1, solar heating system
132	AW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, solar heating system
133	AW	1	Heating water buffer storage unit, mixer circuit 1, Solar heating system
134	AW	1	Heating water buffer storage unit, DHW cylinder 1, mixer circuit 1, solar heating system
135	AW	1	Heating water buffer storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1, solar heating system
140	AW	1	External selection 1

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Implementing a system definition (cont.)

No.	Type	Number of stages	System
141	AW	1	External control 1, DHW cylinder 1
142	AW	1	External control 1, DHW cylinder 1, DHW cylinder 2
200	BW	1	Modulating system, mixer circuit 1
201	BW	1	Modulating system, DHW cylinder 1, mixer circuit 1
202	BW	1	Modulating system, DHW cylinder 1, DHW cylinder 2, mixer circuit 1
205	BW	1	Modulating system, mixer circuit 1, solar heating system
206	BW	1	Modulating system, DHW cylinder 1, mixer circuit 1, solar heating system
207	BW	1	Modulating system, DHW cylinder 1, DHW cylinder 2, mixer circuit 1, solar heating system
210	BW	1	De-coupled modulating storage unit, mixer circuit 1
211	BW	1	De-coupled modulating storage unit, DHW cylinder 1, mixer circuit 1
212	BW	1	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1
220	BW	2	Modulating system, mixer circuit 1
221	BW	2	Modulating system, DHW cylinder 1, mixer circuit 1
222	BW	2	Modulating system, DHW cylinder 1, DHW cylinder 2, mixer circuit 1
225	BW	2	Modulating system, mixer circuit 1, solar heating system
226	BW	2	Modulating system, DHW cylinder 1, mixer circuit 1, solar heating system
227	BW	2	Modulating system, DHW cylinder 1, DHW cylinder 2, mixer circuit 2, solar heating system
230	BW	2	De-coupled modulating storage unit, mixer circuit 1
231	BW	2	De-coupled modulating storage unit, DHW cylinder 1, mixer circuit 1
232	BW	2	De-coupled modulating storage unit, DHW cylinder 1, DHW cylinder 2, mixer circuit 1

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Select the required language

Menu item	Key
■ System parameters	B
■ Tech. service level	E
■ Further menu items	E
■ Select language	B

■ Save settings and exit menu ..... OK

Setting the operating mode

Setting options:
- *Off*
- *Reduced*
- *Standard*
- *Rotary selector*
- *BUS BWS (without function)*
- *Timer*
- *Remote control*

With the first three operating modes, the heat pump circuit will be operated at a constant temperature, irrespective of any other settings (e.g. operating mode selector).
*With the "**Rotary selector**" setting, the actual mode selected at the operating mode selector is decisive.*
*With the "**Timer**" setting, the heat pump operates independent of the operating mode selector in accordance with the programmed switching times.*
*With the "**Remote control**" setting, the actual mode selected at the remote control unit is decisive.*

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Select op. mode" with the ↑ and ↓ keys. Set the required operating mode with the >> and << keys.

■ Save settings and exit menu ..... BACK

5862 241 GB

Setting the heating curve

The heat pump operates with a curve, which demonstrates the following context:

- *for a modulating system or system with modulating storage unit $T_R = f(T_A)$*
- *for a system with heating water buffer storage unit $T_S = f(T_A)$*

T_A Outside temperature
T_R Heat pump inlet temperature
T_S Temperature in the heating water buffer storage unit

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "curve" and open menu with **>>>**.
Change the slope with keys **S+** and **S–**, and set the parallel offset with keys **B+** and **B–**.
The appropriate temperature value will be displayed for the outside temperatures + 10 °C, 0 °C and – 10 °C.

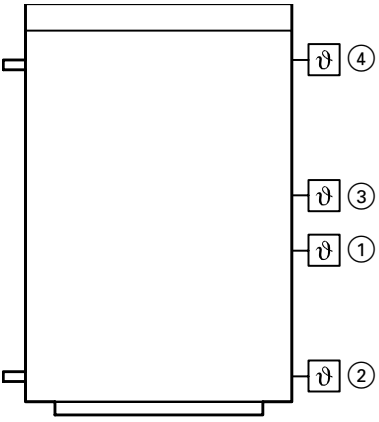
■ Save settings and exit menu ..... **BACK**

Additional sensors

To increase the heat pump efficiency, this menu item enables additional sensors for modulating systems and systems with heating water buffer storage unit to be defined.

Modulating system
Setting options:
- None
- Room temperature sensor

The connection remains inactive if you select "None". A connected return temperature sensor will be recognised, if you select "Room temperature sensor".
Then the menu item "Max. return temperature deviation" appears (see page 141).



System with heating water buffer storage unit
Setting options:
- None
- 2 x add. storage unit

The heating of the heating water buffer storage unit will be controlled by the upper and lower temperature sensors in the storage units. With the "2 x add. storage unit" setting, the heating of the heating water buffer storage unit can be controlled via four storage unit temperature sensors.

- **Standard or permanent operation**
  The heating-up of the heating water storage unit is started by temperature sensor ① and ended by temperature sensor ②. The upper storage unit temperature sensors ③ and ④ have no function. The heating water buffer storage unit will be fully heated up. This operating mode is selected as being active during cheap tariff times.
- **Reduced operation**
  The heating-up of the heating water storage unit is started by temperature sensor ③ and ended by temperature sensor ④. The storage unit temperature sensors ① and ② have no function. Only the top of the heating water buffer storage unit will be heated up (part loading). This operating mode is selected as being active during normal tariff times.

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Additional sensors (cont.)

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Additional sensors" and adjust the additional sensor with keys **>>** and **<<**.

■ Save settings and exit menu ..... **BACK**

Setting the maximum room temperature deviation

This menu item is only displayed with modulating systems and when a room temperature sensor has been set up as "Additional sensor" (see page 140). The heat pump is stopped, if the actual room temperature exceeds the set value plus the value set here.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "max. room temp. dev." and adjust with keys **+0.1** and **–0.1**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Fixed value control

This menu item enables a constant set value for loading the heating water buffer storage unit to be determined.

Menu item — Key
- Programming C
- Heat pump ..... A

After entering "Yes", set the permanent temperature and the switching times.

Highlight "Fixed value contr." and adjust with keys YES and NO.

- Save settings and exit menu ..... BACK

Setting the fixed temperature

This menu item will only be displayed, if the heat pump has been agreed to operate under fixed value control (see above).

Menu item — Key
- Programming C
- Heat pump ..... A

Highlight "Fixed temperature" and adjust the set value for the heating water buffer storage unit with keys +1.0 and –1.0.

- Save settings and exit menu ..... BACK

5862 241 GB

Setting the maximum control temperature

The control unit never lets the set control temperature (flow or return temperature) exceed the maximum value set here. All compressors are immediately stopped, if the control temperature should, nevertheless, rise higher than the set maximum value (e.g. because a consumer is suddenly switched off).

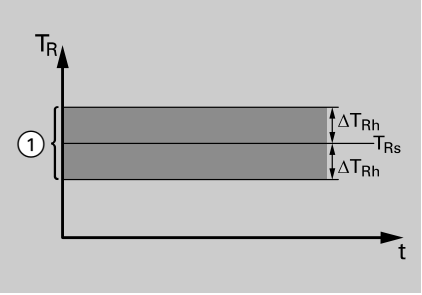
Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Max. contr. temp." and adjust the control temperature value with keys **+1.0** and **–1.0**.

■ Save settings and exit menu ..... **BACK**

Setting the control hysteresis

The control hysteresis defines the working range of the active compressor: $T_{Rs} \pm \Delta T_{Rh}$
As long as the control temperature T_R remains within the operational range ① of the active compressor, it will be neither switched on nor off. The active compressor will be stopped, if the control temperature rises above $T_{Rs} + \Delta T_{Rh}$. The active compressor will be stopped, if the control temperature falls below $T_{Rs} - \Delta T_{Rh}$.



T_R	Control temperature (flow or return temperature)
T_{Rs}	Set control temperature
ΔT_{Rh}	Control hysteresis
t	Time

Menu item — Key
- Programming C
- Heat pump ..... A

See the chapter "Setting the max. operating time" (page 147).

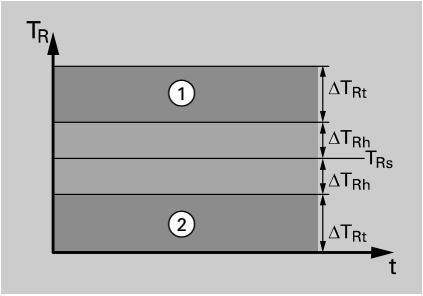
Highlight "Contr. hysteresis" and adjust the control hysteresis with keys **+0.5** and **–0.5**.

- Save settings and exit menu ..... **BACK**

Setting the control tolerance

Multi-stage heat pumps

Too much heat will be produced if the control temperature exceeds the upper tolerance range ①. Consequently, the heating output must be reduced.
As the active compressor has already stopped when the upper control hysteresis was exceeded, but the compressor temperature continued to rise, the next lower compressor becomes the active compressor.
More heat will be demanded than can be delivered by the currently active compressor if the control temperature falls below the lower tolerance range ②. Consequently, the heating output must be increased.
The next compressor will be started as soon as the active compressor has reached its minimum operating time (see the bottom of this page).



T_R	Control temperature
T_{Rs}	Set control temperature
ΔT_{Rh}	Control hysteresis
ΔT_{Rt}	Control tolerance
t	Time

Menu item	Key
■ Programming	C
■ Heat pump	A

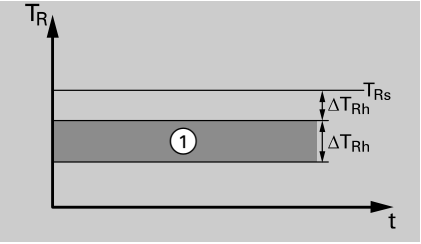
Highlight "Control tolerance" and adjust the control tolerance with keys **+0.5** and **–0.5**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the minimum operating time — Multi-stage heat pumps

The compressor should, in order to achieve a high efficiency level, operate for a certain minimum length of time.
More heat will be demanded than can be delivered by the currently active compressor, if the control temperature falls below the lower tolerance range (1).
The next compressor will be started as soon as the active compressor has reached its minimum operating time.
The "run-up" of a multi-stage system therefore depends on the minimum operating time, since every compressor must initially run for its minimum operating time.



T_R	Control temperature
T_{Rs}	Set control temperature
ΔT_{Rh}	Control hysteresis
t	Time

Menu item	Key
■ Programming	C
■ Heat pump	A

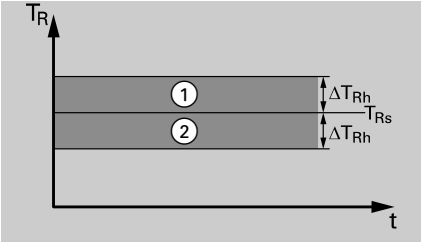
Highlight "Minimum op. time" and adjust the minimum operating time with keys **+30s** and **–30s**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the maximum operating time — Multi-stage heat pumps

The compressor temperature is constantly in operating range ①.
It is also slightly too high. The compressor is switched off as soon as the maximum operating time has expired, and the next lower compressor will be activated.
The compressor temperature is constantly in operating range ②. This also lies within the lower hysteresis range, but does not reach the set value. Consequently, the heat demand is higher than the output of the active compressor. The next compressor is started after the maximum operating time of the active compressor has expired twice.



T_R	Control temperature
T_{Rs}	Set control temperature
ΔT_{Rh}	Control hysteresis
t	Time

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Max. op. time" and adjust the maximum operating time with keys **+30s** and **–30s**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the minimum compressor rest time

If necessary, this setting should only be corrected upwards (standard setting 15 min) to protect the solid shaft soft starter.

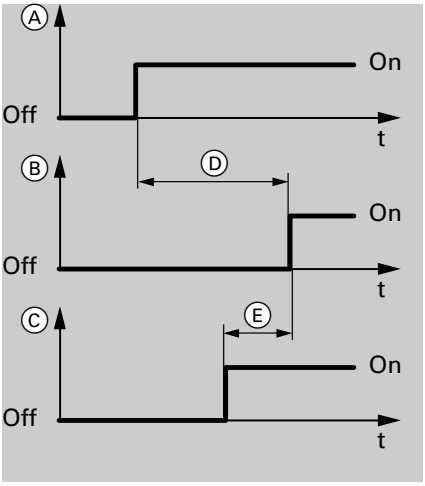
Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Min. compressor off" and adjust the minimum compressor operating time with key **+10s**.

■ Save settings and exit menu ..... **BACK**

Setting the secondary pump flow

The heating water in the secondary circuits must already circulate, when the compressor is started, to safeguard the immediate heat transfer.



Ⓐ Heating command
Ⓑ Compressor
Ⓒ Secondary pump
Ⓓ Start delay
Ⓔ Flow – secondary pump

Menu item	Key
■ Programming	C
■ Heat pump	A

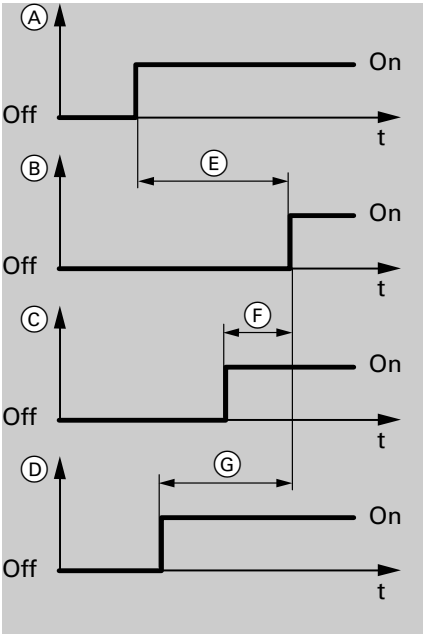
Highlight "Flow sec. pump" and adjust the flow time with keys **+10s** and **–10s**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the primary pump or fan flow

The flow time of the primary pump (type BW, WW) or the fan (typ AW) is required for ensuring that the primary circuit is already circulating, when the compressor is started.



Ⓐ Heating command
Ⓑ Compressor
Ⓒ Secondary pump
Ⓓ Primary pump or fan
Ⓔ Start delay
Ⓕ Flow – secondary pump
Ⓖ Flow – primary circuit

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Primary pump flow" or "Fan flow" and adjust the flow time with keys **+10s** and **–10s**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the final loading of the heating water buffer storage unit

To ensure that the heating water buffer storage unit is fully loaded, when the system changes over to the standard tariff supply, it is re-loaded once more during the low tariff time with "Final loading". If, for example, 60 minutes is set, the "Final loading" would commence 60 minutes before the changeover to reduced operation (or Off).

Preconditions:

- *The actual temperature at the lower storage unit temperature sensor must be lower than the set temperature.*
- *The control unit must change over from permanent or standard operation to reduced operation or Off.*

Menu item — Key

- Programming C
- Heat pump ..... A

Highlight "Final loading" and adjust the final loading time with keys **+60s** and **–60s**.

- Save settings and exit menu ..... **BACK**

Match the discharge time to the storage unit size. Match the heat pump switching times to the changeover times from cheap to standard tariff (only possible for timer-dependent tariff changes implemented by your electricity supplier).

Setting the primary pump pressure test — Type BW

The set value determines the amount of time which should lapse, until the flow switch or the brine pressure switch begin to monitor circulation. This enables flow to build up prior to measurements being taken, and safeguards a perfect heat pump start.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "PP press.test after" and adjust with keys **+1s** and **–1s**.

■ Save settings and exit menu ..... **BACK**

Number of satellites

This menu has no function and should always be set to "0".

Setting the hours run balance

Multi-stage heat pumps

The hours run balance determines which compressor is called upon to be part of the active stage, when a heat demand (not storage heating) occurs:

- *Hours run balance: Yes (equal usage of compressors)*
  In case of heat demand, the compressor which has operated the least hours is started first. The compressor which has operated the most hours is shut down first.
- *Hours run balance: No (unequal usage of compressors)*
  In every case, compressor 1 is started first; further heat demand is then covered by switching on compressor 2. Compressor 1 always remains the first compressor.
  The same applies to the second compressor.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Hours run balance" and activate or de-activate with keys **YES** and **NO**.

■ Save settings and exit menu ..... **BACK**

Setting the air defrost mode — Type AW

*The compressor should always be defrosted with hot gas (through the compressor output). For that reason "Air defrost mode" should **always** be set to: **No**".*

Menu item — Key
- Programming C
- Heat pump ..... A

Check, whether "Air defrost mode" is set to "NO"; if not:
Highlight "Air defrost mode" and set with key **NO** .

- Save settings and exit menu ..... **BACK**

Setting the temperature for defrost start — Type AW

Defrosting starts when:
- *the system has waited for the minimum defrost pause,*
- *the actual temperature at the compressor is lower than the "Start defrost temp." set here.*

As standard, 0 °C is set up, i. e. at evaporator temperatures below 0 °C after the defrost pause, the circulation pump is switched off, the heat demand is ignored and defrosting starts.

Menu item — Key
- Programming C
- Heat pump ..... A

Highlight "Start defrost temp." and adjust with keys **+0.5** and **–0.5**.

- Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the temperature for defrost end — Type AW

Defrosting ends, if the set temperature has been exceeded at the compressor. The heating circuit pump is stopped again, the hot gas valve is closed, the liquid gas valve is opened and the fan is started.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "End defrost temp." and adjust with keys **+1.0** and **–1.0**.

■ Save settings and exit menu ..... **BACK**

Setting the maximum defrost time — Type AW

Defrosting ends, if the temperature value set for the end of defrosting has not been reached, but the set defrost time has expired. The heating circuit pump is started again, the liquid gas valve is opened, the hot gas valve is closed and the fan is started.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight the "Max. defrost time" and adjust with keys **+60s** and **–60s**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the maximum HP defrost time — Type AW

The heating circuit pump is stopped, if defrosting has started. The liquid gas valve, the hot gas valve and the fan are only switched, if the pressure switch in the gas pressure pipe has reacted or the time set here has expired.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Max. HP defrost time" and adjust with keys **+5s** and **–5s**.

■ Save settings and exit menu ..... **BACK**

Setting the minimum defrost pause — Type AW

The "Minimum defrost pause" is the minimum amount of time between two defrost phases.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Min. defrost pause" and adjust with keys **+60s** and **–60s**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the second heat source — Type BW

For type AW, the control unit is preset for operation with a second heat source (dual operating mode).

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Second heat source" and adjust with keys **YES** and **NO**.

■ Save settings and exit menu ..... **BACK**

Setting alternative or parallel operation

For type BW, this menu item only appears if the menu item "2nd heat source" has been set to "Yes" (dual operating mode).
If only one heat source (heat pump or second heat source) is active, set this option to "Alternative: Yes". If both heat sources are in parallel operation, adjust this option to "Alternative: No".

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Alternative" and adjust with keys **YES** and **NO**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the minimum primary inlet temperature

For type BW, this menu item only appears if the menu item "2nd heat source" has been set to "Yes" and "Alternative: Yes".

The heat pump is stopped, if the primary inlet temperature (average over 1 minute) is lower than the value set here (bivalence point).
The compressors, fans and the heating circuit pump are stopped, and the second heat source is activated.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight the "Min. prim inlet temp." and adjust with keys **+0.5** and **–0.5**.

■ Save settings and exit menu ..... **BACK**

Setting the start delay for the second heat source

For type BW, this menu item only appears if the menu item "2nd heat source" has been set to "Yes".
The heat pump is stopped, if the actual temperature falls below the "Minimum primary inlet temperature" (bivalence point). The second heat source receives the heating command after the time set here has expired.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Start delay 2nd HS" and adjust with keys **+60s** and **–60s**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the restart hysteresis

For type BW, this menu item only appears if the menu item "2nd heat source" has been set to "Yes".
The actual primary inlet temperature is compared with the "Minimum primary inlet temperature" (bivalence point), plus the hysteresis set here, after the set start delay (see page 160) has expired. The heat pump starts again and the second heat source is stopped, if the primary inlet temperature is higher.

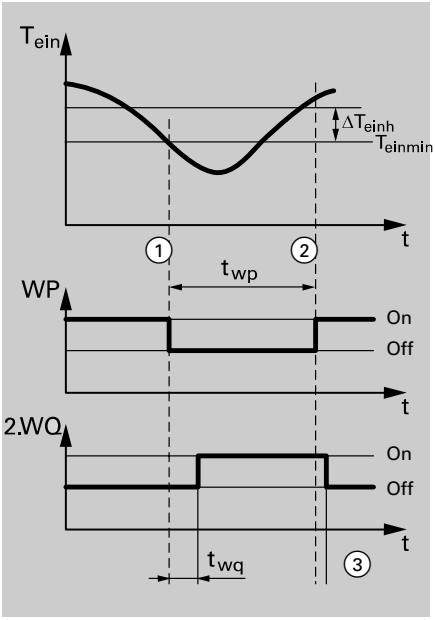
Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Restart hysteresis" and adjust with keys **+1.0** and **–1.0**

■ Save settings and exit menu ..... **BACK**

Setting the heat pump start delay

For type BW, this menu item only appears if the menu item "2nd heat source" has been set to "Yes".
If the heat pump has stopped because the primary inlet temperature is too low (below bivalence point), the primary inlet temperature will only be re-checked after expiry of the start delay. The start delay re-commences prior to the next measurement being taken, if the primary inlet temperature is still too low.



T_{ein}	Primary inlet temperature
ΔT_{einh}	Restart hysteresis
T_{einmin}	minimum primary inlet temperature
t_{wp}	Start delay heat pump
t_{wq}	Start delay 2nd heat source
t	Time
WP	Heat pump
2.WQ	Second heat source

5862 241 GB

Setting the heat pump start delay (cont.)

① $T_{ein} < T_{ein\ min}$
The inlet temperature has exceeded the minimum value. The heat pump will be stopped. The second heat source will be started after expiry of the start delay.

② $T_{ein} > (T_{ein\ min} + \Delta T_{einh})$
After expiry of the start delay for the heat pump, the primary inlet temperature has exceeded the minimum value plus restart hysteresis. The second heat source is stopped after a dealy (see ③), and the heat pump startet, if required.

③ The second heat source is not started immediately after the conditions have been met, but is started if the conditions are still met four minutes later.

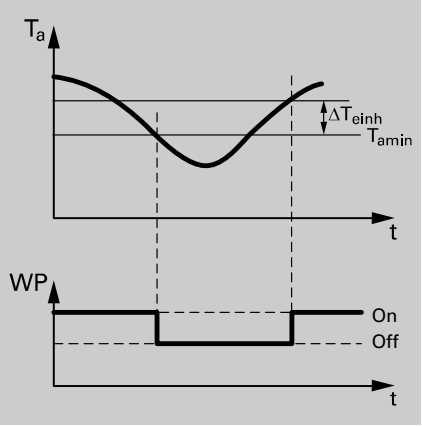
Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Start delay 2nd HS" and adjust with keys **+60s** and **–60s**.

■ Save settings and exit menu ..... **BACK**

Setting the minimum outside temperature — Type BW

This menu item is only displayed if "Alternative: No" has been selected. The compressor and the primary pump are stopped, if the average outside temperature over a three hour period falls below the value set here. Both will only be restarted, if the average outside temperature over three hours is higher than the value set here plus restart hysteresis (see page 159), and if there is a demand.



T_a	Outside temperature
T_{amin}	Min. outside temperature
ΔT_{einh}	Restart hysteresis
t	Time
WP	Heat pump

Menu item	Key
■ Programming	C
■ Heat pump	A

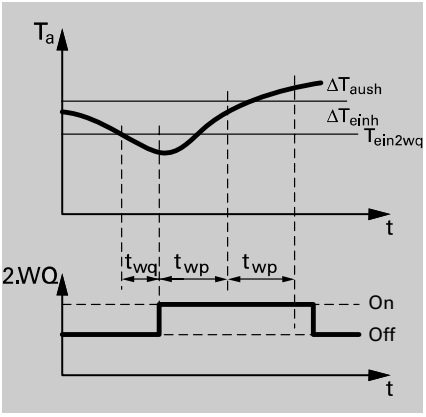
Highlight "Min. outside temperature" and adjust with keys **+1.0** and **–1.0**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the switch-on temperature for the second heat source

For type BW, this menu item only appears if "2nd heat source: Yes" has been selected, and if "Alternative: No" has been selected for all types of heat pumps.
If the average outside temperature over a three hour period falls below the value set here, the second heat source will be activated and, in case of demand, started after expiry of the start delay for the second heat source. After the start delay for the heat pump has expired the system checks, whether the average outside temperature over a three hour period is higher than the value set here plus stop hysteresis for the second heat source. The second heat source will be stopped if this is the case. If it is not, then the start delay restarts, prior to the outside temperature being scanned again.



T_a	Outside temperature
ΔT_{aush}	Stop hysteresis 2nd HS
T_{ein2wq}	Start temperature 2nd HS
t_{wp}	Start delay HP
t_{wq}	Start delay 2nd HS
t	Time
WP	Heat pump
2.WQ	Second heat source

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Start tem. 2nd HS" and adjust with keys **+1.0** and **–1.0**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting electrical blocking

For type BW, this menu item only appears if "2nd heat source: Yes" has been selected.
The second heat source is stopped and blocked, if the menu item "E blocking: Yes" has been selected and the electricity supplier has activated the blocking of your electricity supply.
Upon demand, the second heat source will be restarted, if your electricity supplier has removed the E blocking signal (blocking removed).
This function has no effect if "E blocking: No" has been selected.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "E blocking" and adjust with keys **YES** and **NO**.

■ Save settings and exit menu ..... **BACK**

Setting the secondary pump with a second heat source

For type BW, this menu item only appears if "2nd heat source: Yes".
This menu item decides, whether the secondary pump is started or stopped when operating with a second heat source.

Menu item	Key
■ Programming	C
■ Heat pump	A

Highlight "Pump ON for 2nd HS" and adjust with keys **YES** and **NO**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting a regulated second heat source

For type BW, this menu item only appears if "2nd heat source: Yes" has been selected.
The second heat source is controlled like a second heat pump stage, if in this menu item "Regulated 2nd HS: Yes" has been selected. The second heat source is always the last stage, without hours run balancing. For heating water buffer storage units, only the upper sensor is taken into consideration. Terminal X8.8 is live as long as the second heat source is active, provided that in this menu item "Regulated 2nd HS: No" has been selected.

Menu item — Key
- Programming C
- Heat pump ..... A

Highlight "Regulated 2nd HS" and adjust with keys YES and NO.

- Save settings and exit menu ..... BACK

Activating the second output

For type BW, this menu item only appears if "2nd heat source: Yes" has been selected.
Terminal X8.13 is always live as long as the second heat source is active, provided that "2nd output: Yes" has been selected.

Menu item — Key
- Programming C
- Heat pump ..... A

*With setting "2nd output: Yes", an immersion heater element (DHW cylinder) can **not** be connected to the control unit.*

Highlight "2nd output" and adjust with keys YES and NO.

- Save settings and exit menu ..... BACK

5862 241 GB

Selecting the operating mode

Setting options:
- *Timer*
- *Off*
- *BUS BWS (without function)*

*With the "**Timer**" setting, the DHW cylinder will be heated independently of the operating mode selector in accordance with the set switching times. With the "**Off**" setting, the DHW cylinder will not be heated, irrespective of other settings.*

Menu item	Key
■ Programming	C
■ DHW cylinder	B

Highlight "Select op. mode" and select the operating mode with keys **>>** and **<<**.

■ Save settings and exit menu ..... **BACK**

Setting the maximum temperature

The three-way changeover valve in the heating flow will be changed over to the heating circuits, when the maximum temperature inside the DHW cylinder is exceeded.

Menu item	Key
■ Programming	C
■ DHW cylinder	B

Highlight the "Max. DHW cylinder" and adjust with keys **+1.0** and **–1.0**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the minimum temperature

The minimum temperature prevents the DHW temperature from falling too low inside the DHW cylinder, when frost protection is active. The DHW cylinder is heated up to its minimum temperature plus hysteresis (independent of the selected operating mode), if the actual temperature falls below the minimum temperature level.
If the DHW cylinder is equipped with two cylinder temperature sensors, the upper sensor will be used to control this function.

Menu item — Key
- Programming C
- DHW cylinder ..... B

Highlight the "Min. DHW cylinder" and adjust with keys **+1.0** and **–1.0**.

- Save settings and exit menu ..... **BACK**

Setting the hysteresis

The hysteresis defines, at how many Kelvin below the set temperature the heating of the DHW cylinder should begin.
Standard setting: 8 K.

Menu item — Key
- Programming C
- DHW cylinder ..... B

Highlight the "Hysteresis" and adjust with keys **+1.0** and **–1.0**.

- Save settings and exit menu ..... **BACK**

5862 241 GB

Additional sensors

If a second cylinder temperature sensor is connected, that sensor must be defined as "Additional sensor: F top" (alternatively "Additional sensor: None".
The upper cylinder temperature sensor is used for starting and the lower cylinder temperature sensor for stopping the heating of the DHW cylinder.

Menu item — Key
- Programming C
- DHW cylinder ..... B

Highlight the "Additional sensor" and adjust with keys **>>** and **<<**.

- Save settings and exit menu ..... **BACK**

Setting DHW cylinder priority

"DHW cylinder priority: Yes"
As priority, the DHW cylinder will be heated, as soon as a heat demand is signalled.

"DHW cylinder priority: No"
Upon demand, the DHW cylinder will only be heated if there is no heat demand from the heating circuits.

Menu item — Key
- Programming C
- DHW cylinder ..... B

Highlight "DHW cylinder priority" and adjust with keys **YES** and **NO**.

- Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the immersion heater element

Enter "2nd HS: Yes" here, if an immersion heater element (DHW cylinder) should be regulated by the control unit.

Menu item — Key
- Programming C
- DHW cylinder ..... B

Highlight "2nd HS" and adjust with keys **YES** and **NO**.

- Save settings and exit menu ..... **BACK**

For the selection "2nd HS: Yes", the switching times must also be selected for the immersion heater element in the menu "DHW cylinder", "Timer".

Selecting the immersion heater element set temperature

This menu item is only displayed if in the control unit, an immersion heater element has been defined for the DHW cylinder.
In the operating mode "2nd heat source", the DHW cylinder will be heated by the immersion heater element to the temperature set here. Select the timing for this operating mode after the operating mode "Heat pump on".

Menu item — Key
- Programming C
- DHW cylinder ..... B

Highlight "2nd HS" and adjust the temperature with keys **+1.0** and **–1.0**.

- Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the number of compressors

In standard setting, the heat pump generally only operates with the first compressor to provide DHW heating.
The second compressor may be selected here for DHW heating via a suitably designed storage unit system.

Menu item — Key
- Programming C
- DHW cylinder ..... B

Highlight "Stages for DHW cylinder" and enable/disable the second compressor with keys + and −.

- Save settings and exit menu ..... BACK

5862 241 GB

Setting a heating circuit with mixer

A heating circuit with mixer is only feasible for systems with heating water buffer storage unit.
The heating circuit with mixer can be operated in weather-compensated mode or as fixed value control.
The heating circuit with mixer can be displayed as "B", "C", "D" or "E". In the following examples, it is described as "C".

Selecting the operating mode

Setting options:
- *Off*
- *Reduced*
- *Standard*
- *Timer*
- *Rotary selector*
- *Remote control*
- *BUS BWS (without function)*

With the first three operating modes, the heating circuit with mixer will be operated at a constant temperature, irrespective of any other settings (e.g. operating mode selector).
*With the "**Timer**" setting, the heating circuit with mixer operates independent of the operating mode selector in accordance with the set switching times.*
*For the "**Rotary selector**" setting, the actual mode selected at the operating mode selector is decisive.*
*With the "**Remote control**" setting, the actual mode selected at the remote control unit is decisive.*

Menu item	Key
■ Programming	C
■ Mixer	C

Highlight "Select op. mode" and select the operating mode with keys >> and <<.

■ Save settings and exit menu	BACK

5862 241 GB

Setting the heating curve

The heating circuit with mixer operates with a curve (heating curve), which indicates the relationship between outside temperature and flow temperature.

Menu item — Key
- Programming C
- Mixer C

Highlight "curve" and open menu with key **>>>** Open menu.
Change the slope with keys **S+** and **S–** , and set the parallel offset with keys **B+** and **B–**.
The appropriate temperature value will be displayed for the outside temperatures + 10 °C, 0 °C and - 10 °C.

- Save settings and exit menu ..... **BACK**

Determine mixer function

With this menu you select whether the mixer operates as
- *central heating*
- *fixed value controller or*
- *as cooling system.*

Menu item — Key
- Programming C
- Mixer C

Highlight "Function" and select the mixer function with keys **>>** and **<<**.

- Save settings and exit menu ..... **BACK**

*Activating this function changes the control unit menus. The modified menus are **not** described in the operating instructions. Please instruct the system user.*

5862 241 GB

Additional sensor

If a room temperature sensor is connected to the heating circuit with mixer, that sensor must be defined as "Additional sensor: room sensor" (alternatively "Additional sensor: None").
The additional menu item "Max. room temp. dev." appears if you select "Room sensor".

Menu item — Key
- Programming C
- Mixer C

Highlight "Additional sensors" and adjust the additional sensor with keys **>>** and **<<**.

- Save settings and exit menu ..... **BACK**

Setting the maximum room temperature deviation

This menu item is only displayed when a room temperature sensor has been set up as "Additional sensor".
The mixer is closed, if the actual room temperature exceeds the set value plus the value set here.

Menu item — Key
- Programming C
- Mixer C

Highlight "Max. room temp. dev." and adjust with keys **+0.1** and **–0.1**.

- Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the fixed temperature

This menu item is only displayed, if the heating circuit with mixer has been set up as fixed value control (see page 172).

Menu item	Key
■ Programming	C
■ Mixer	C

Highlight "Fixed temperature" and adjust with keys **+1.0** and **–1.0**.

■ Save settings and exit menu ..... **BACK**

Setting the load rise

The load rise indicates the difference between the flow temperature of the heat pump circuit and the flow temperature of the heating circuit with mixer.
"Load rise: No" means, that the heating circuit with mixer operates without feedback to the heat pump.
"Load rise: Yes" means, that the heating circuit with mixer sends a heat demand signal to the heat pump control unit.

Menu item	Key
■ Programming	C
■ Mixer	C

Highlight "Load rise" and adjust with keys **YES** and **NO**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the temperature differential for a load rise

This menu item will only be displayed, if "Load rise: Yes" has been selected (see above).
The flow temperature of the heat pump circuit is higher/lower than the flow temperature of the heating circuit with mixer by the amount set here.

Menu item	Key
■ Programming	C
■ Mixer	C

Highlight "Load rise" and adjust the temperature difference with keys +1.0 and –1.0.

■ Save settings and exit menu ..... BACK

Setting the maximum flow temperature

The control unit calculates the flow temperature set value from the curve (heating curve), but never allows it to go higher than the value set here, minus the dead or active range (see page 176).
The mixer closes, if the flow temperature should still rise higher than the maximum value set here.

Menu item	Key
■ Programming	C
■ Mixer	C

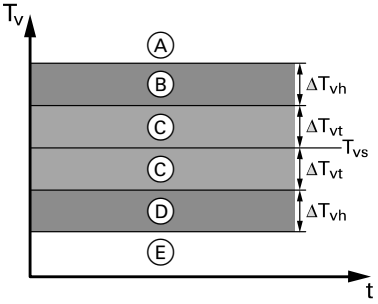
Highlight the "Max. flow temp." and adjust with keys +1.0 and –1.0.

■ Save settings and exit menu ..... BACK

5862 241 GB

Setting the active range

The active range indicates the range, within which the mixer opens or closes.



R_V Flow temperature
T_{Vs} Set flow temperature
ΔT_{Vh} Active range
ΔT_{Vt} Dead range
t Time

Ⓐ Mixer permanently closed
Ⓑ Mixer closes (modulating)
Ⓒ Mixer motor at zero volt
Ⓓ Mixer opens
Ⓔ Mixer permanently open

Menu item	Key
■ Programming	C
■ Mixer	C

Highlight the "Active range" and adjust with keys **+0.5** and **–0.5**.

■ Save settings and exit menu ..... **BACK**

Setting the dead range

The dead range describes that temperature range, in which the mixer motor is at zero volt (see active range illustration). The mixer motor begins to cycle in accordance with an impulse duration modulation, as soon as the flow temperature falls below or exceeds this range.

Menu item	Key
■ Programming	C
■ Mixer	C

Highlight the "Dead range" and adjust with keys **+0.5** and **–0.5**.

■ Save settings and exit menu ..... **BACK**

5862 241 GB

Setting the phase duration

The period influences the length of cycle.
This does not affect the cycle ratio.
The period must match the mixer motor speed. It should be shorter than 1/10 of the mixer operating time.

Menu item — Key
- Programming C
- Mixer C

Highlight "Period" and adjust with keys +1s and –1s.

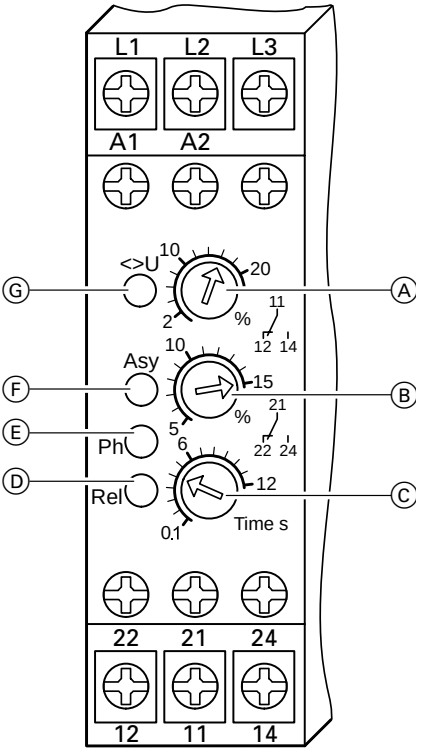
- Save settings and exit menu ..... BACK

Setting the DHW cylinder priority

This menu item should always be set to "DHW cylinder priority:OFF", so that the heating circuit with mixer will be heated by the heating water buffer storage unit inspite of the need for DHW heating.

5862 241 GB

Phase failure relay



The following deviations are set up in the "as delivered condition":

- Over/undervoltage: 15 %
- Phases asymmetric: 15 %
- Switching delay: 4 s

Remove the cause if the relay activates. Resetting the relay is not required.

Ⓐ Over/under voltage in %
Ⓑ Phases asymmetric by %
Ⓒ Switching delay in s
Ⓓ Operational display
Ⓔ Fault display phase failure/ phase sequence
Ⓕ Fault display asymmetric
Ⓖ Fault display over/under voltage

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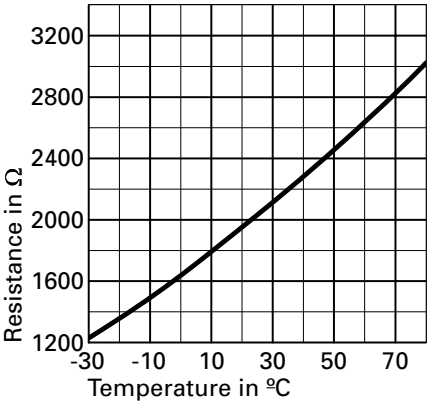
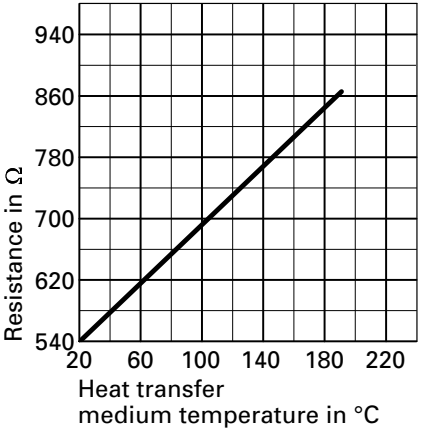
Sensor resistance curve

Outside temperature sensor, room temperature sensor, return temperature sensor, storage unit temperature sensor and flow temperature sensor



Collector temperature sensor



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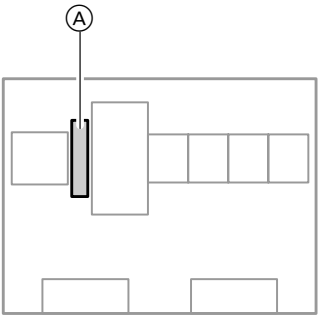
Fuse

The fuse is located in a fuse base on the carrier rail inside the control panel.



Ⓐ Fuse holder with fuse inside the heat pump control panel

Fuse: 6.3 A, 250 V
(max. rating ≦ 2.5 W)

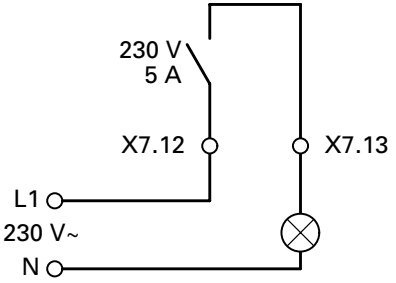
1. Flip up the top.

2. Open the top from the side, using a screwdriver.

⚠ ***Safety instructions***
Opening automatically cuts the power.

Central fault indication

Heat pump system faults may be displayed optically as central fault messages.
The fault display remains active, until the error has been removed.



Connection
Zero-volt contact
Load capacity: 230 V~ 5A

Please note:
The fault message becomes active 10 seconds after the fault occurs.

Sensor connections and function for different system versions

Sensor description	Function in			Terminal code
	heating mode	Solar heating mode	Natural cooling	
F0	Outside temperature 1			X 1.16 / 2.16
F1	Outside temperature 2			X 1.15 / 2.15
F2	Primary flow			X 1.24 / 2.24
F3	Primary return			X 1.23 / 2.23
F4	Defrosting 1		Dew point 1	X 1.22 / 2.22
F5	Defrost HP 1			X 1.21 / 2.21
F6 F7	Remote control 1 with room temperature sensor		Room temperature sensor 1	X 1.14 / 2.14 X 1.13 / 2.13
F8	Heat pump flow			X 1.20 / 2.20
F9	Heat pump return			X 1.19 / 2.19
F10	Heating water buffer storage unit 1, top			X 1.12 / 2.12
F11	Heating water buffer storage unit 1, bottom			X 1.11 / 2.11
F12	Flow, mixer circuit 1		Cooling, flow 1	X 1.10 / 2.10
F13	Flow, mixer circuit 2	DHW cylinder temperature sensor	Cooling, flow 2	X 1. 9 / 2. 9
F14	DHW cylinder temperature sensor 1			X 1. 8 / 2. 8
F15	DHW cylinder temperature sensor 2			X 1. 7 / 2. 7
F16 F17	Remote control 2 with room temperature sensor		Room temperature sensor 2	X 1. 6 / 2. 6 X 1. 5 / 2. 5
F18	Defrosting 2		Dew point 2	X 1.18 / 2.18
F19	Defrost HP 2			X 1.17 / 2.17
F20	Heating water buffer storage unit 2, top	Central heating		X 1. 4 / 2. 4
F21	Heating water buffer storage unit 2, bottom			X 1. 3 / 2. 3
F22		Swimming pool sensor		X 1. 2 / 2. 2
F23		Collector temperature sensor		X 1. 1 / 2. 1

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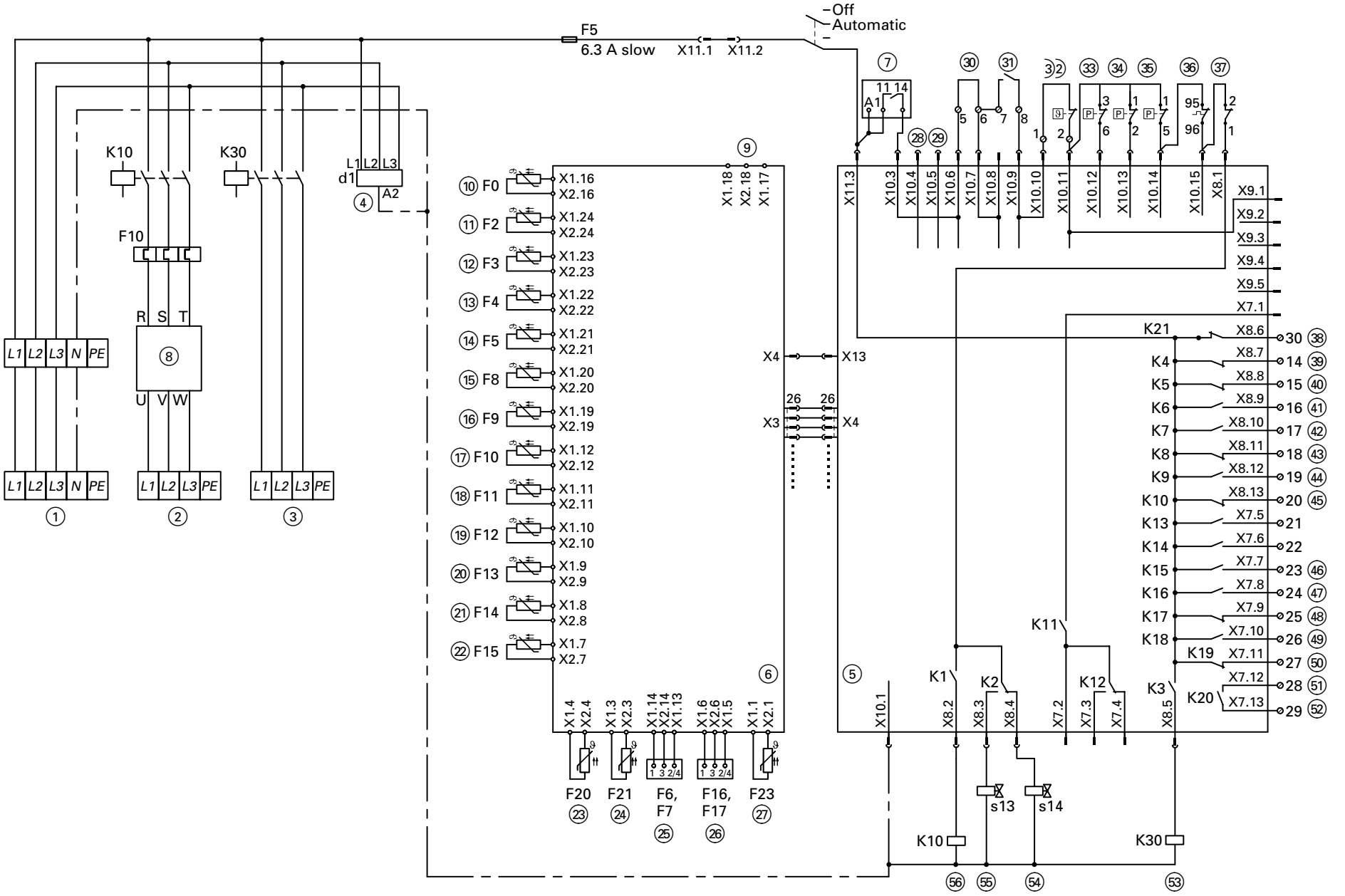
System terminals inside the control panel (230 V~)

Terminal code	Function
1, 2	Frost protection thermostat, 1st stage
3, 4	Frost protection thermostat, 2nd stage
5, 6	Flow switch
7, 8	EVU shut-down conversion kit
14	Secondary pump
15	Direct heating water heater (selection)
16	Mixer 1 OPEN
17	Mixer 1 CLOSE
18	Heating circuit pump 1
19	Three-way changeover valve 1
20	Immersion heater element 1 (selection)
23	Mixer 2 OPEN
24	Mixer 2 CLOSE
25	Heating circuit pump 2
26	Three-way changeover valve 2
27	Immersion heater element 2 (selection)
28	Central fault message, zero-volt
29	Central fault message, zero-volt
30	Solar heating circuit circulation pump

5862 241 GB

Vitocal 300, type AW



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Vitocal 300, type AW (cont.)

Connections 3/N/PE~400V
① Mains connection 3/N/PE~400V
② Compressor
③ Fan
④ Phase failure relay (input)
⑤ Controller circuit board
⑥ Sensor connection board
⑦ Phase failure relay (switching contact)
⑧ Soft starter*1

Analogue inputs
⑨ Hot gas defrosting
⑩ Outside temperature sensor 1
⑪ Primary flow temperature sensor
⑫ Primary return temperature sensor
⑬ Hot gas defrosting sensor
⑭ Hot gas defrosting limiter
⑮ Flow temperature sensor
⑯ Return temperature sensor
⑰ Upper temperature sensor in heating water buffer storage unit 1
⑱ Lower temperature sensor in heating water buffer storage unit 1
⑲ Flow temperature sensor in heating circuit 1 (accessory)
⑳ Flow temperature sensor in the heating circuit 2 (accessory)
㉑ Lower temperature sensor in DHW cylinder 1
㉒ Upper temperature sensor in DHW cylinder 2
㉓ Upper temperature sensor in heating water buffer storage unit 2
㉔ Lower temperature sensor in heating water buffer storage unit 2
㉕ Remote control 1 (accessory) incl. room temperature sensor 1
㉖ Remote control 2 (accessory) incl. room temperature sensor 2
㉗ Collector temperature sensor

Digital inputs
㉘ Heat pump remote control
㉙ N/A
㉚ Jumper
㉛ E blocking
㉜ Klixon fan
㉝ Safety HP
㉞ Low pressure
㉟ Controlled HP
㊱ Compressor with thermostatic relay
㊲ Pressure switch

Outputs
㊳ Solar heating circuit circulation pump
㊴ Secondary pump
㊵ Second heat source
㊶ Mixer 1 OPEN
㊷ Mixer 1 CLOSE
㊸ Heating circuit pump 1
㊹ Three-way changeover valve 1
㊺ Immersion heater element
㊻ Mixer 2 OPEN
㊼ Mixer 2 CLOSE
㊽ Heating circuit pump 2
㊾ Three-way changeover valve 2
㊿ Immersion heater element

(51) Central fault indication, zero-volt
(52) Central fault indication, zero-volt
(53) Fan
(54) Solenoid valve liquid gas
(55) Solenoid valve defrosting
(56) Compressor

*1*Only for types 108, 110, 113 and 116.*

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Vitocal 300, type BW

Connections 3/N/PE~400V
① Mains connection 3/N/PE~400V
② Compressor 1
③ Compressor 2
④ Primary pump
⑤ Phase failure relay (input)
⑥ Controller circuit board
⑦ Sensor connection board
⑧ Phase failure relay (switching contact)
⑨ Soft starter*1

Analogue inputs
⑩ Outside temperature sensor 1
⑪ Primary flow temperature sensor
⑫ Primary return temperature sensor
⑬ Collector temperature sensor
⑭ Flow temperature sensor
⑮ Return temperature sensor
⑯ Upper temperature sensor in heating water buffer storage unit 1
⑰ Lower temperature sensor in heating water buffer storage unit 1
⑱ Flow temperature sensor in heating circuit 1 (accessory)
⑲ Flow temperature sensor in the heating circuit 2 (accessory)
⑳ Lower temperature sensor in DHW cylinder 1
㉑ Upper temperature sensor in DHW cylinder 2
㉒ Upper temperature sensor in heating water buffer storage unit 2
㉓ Lower temperature sensor in heating water buffer storage unit 2
㉔ Remote control 1 (accessory) incl. room temperature sensor 1
㉕ Remote control 2 (accessory) incl. room temperature sensor 2

Digital inputs
㉖ Remote selection of heat pump or EVU signal
㉗ Remote selection of heat pump
㉘ Brine pressure switch*2
㉙ E blocking (accessory)
㉚ Thermal overload relay – primary pump
㉛ Safety HP compressor 1
㉜ LP compressor 1
㉝ Controlled HP compressor 1
㉞ Thermal overload relay – compressor stage 1
㉟ Safety HP compressor 2
㊱ LP compressor 2
㊲ Controlled HP compressor 2
㊳ Thermal overload relay – compressor 2

Outputs
㊴ Solar heating circuit circulation pump
㊵ Secondary pump
㊶ Second heat source (heating water direct water heater)
㊷ Mixer 1 OPEN
㊸ Mixer 1 CLOSE
㊹ Heating circuit pump 1
㊺ Three-way changeover valve 1
㊻ Immersion heater element
㊼ Mixer 2 OPEN
㊽ Mixer 2 CLOSE
㊾ Heating circuit pump 2
㊿ Three-way changeover valve 2
(51) Immersion heater element
(52) Central fault message, zero-volt
(53) Central fault message, zero-volt
(54) Primary pump
(55) Shut-off valve compressor 2
(56) Solenoid valve liquid gas compressor 2
(57) Compressor stage 2
(58) Solenoid valve liquid gas compressor 1
(59) Compressor stage 1

*1 *Only for types 108, 110, 113, 116, 216, 220, 226 and 232.*
*2 *If not connected, remove the jumper between the terminals 5 and 6.*

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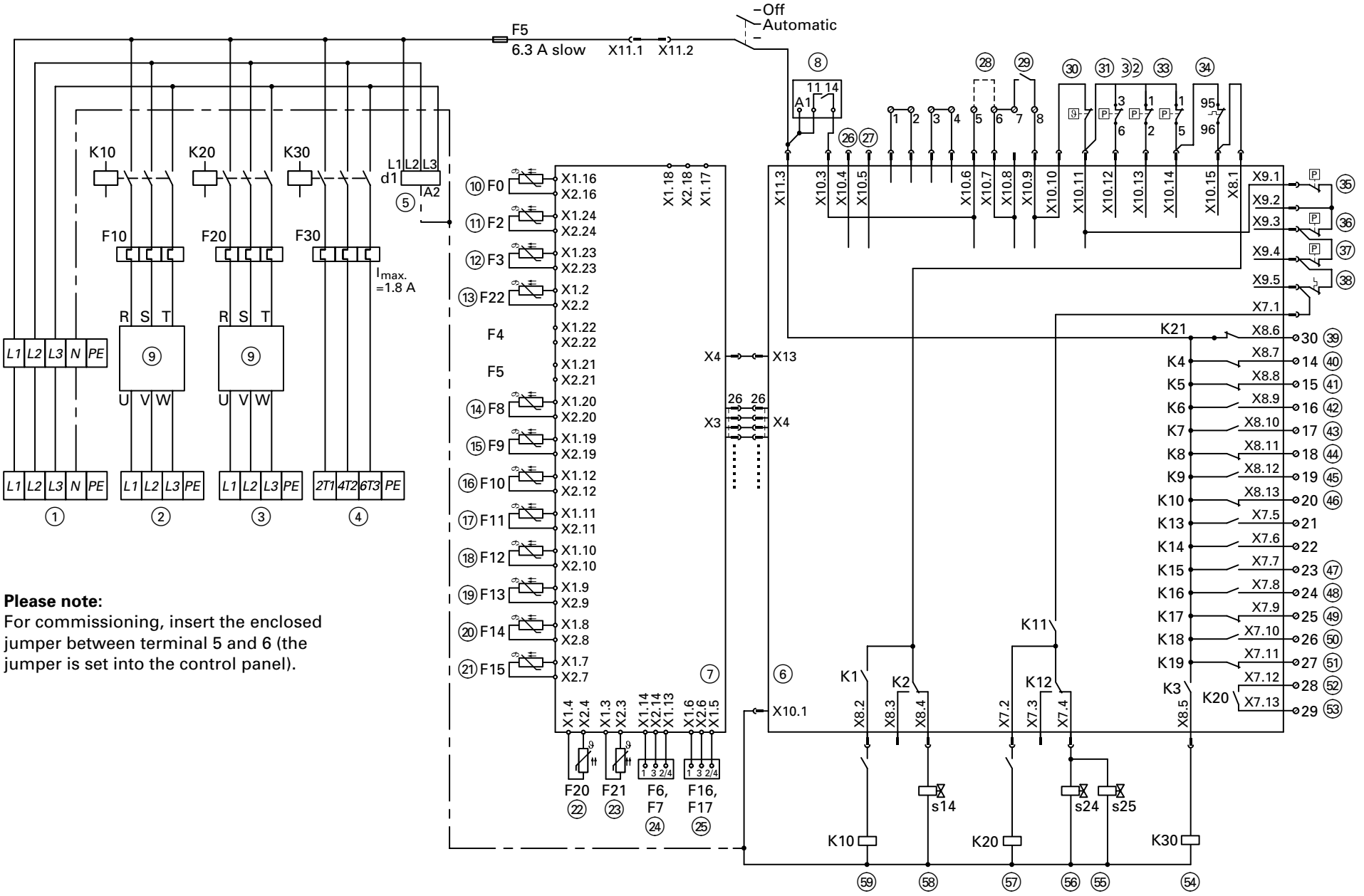
Vitocal 300, type BW (cont.)



Please note:
For commissioning, insert the enclosed jumper between terminal 5 and 6 (the jumper is set into the control panel).

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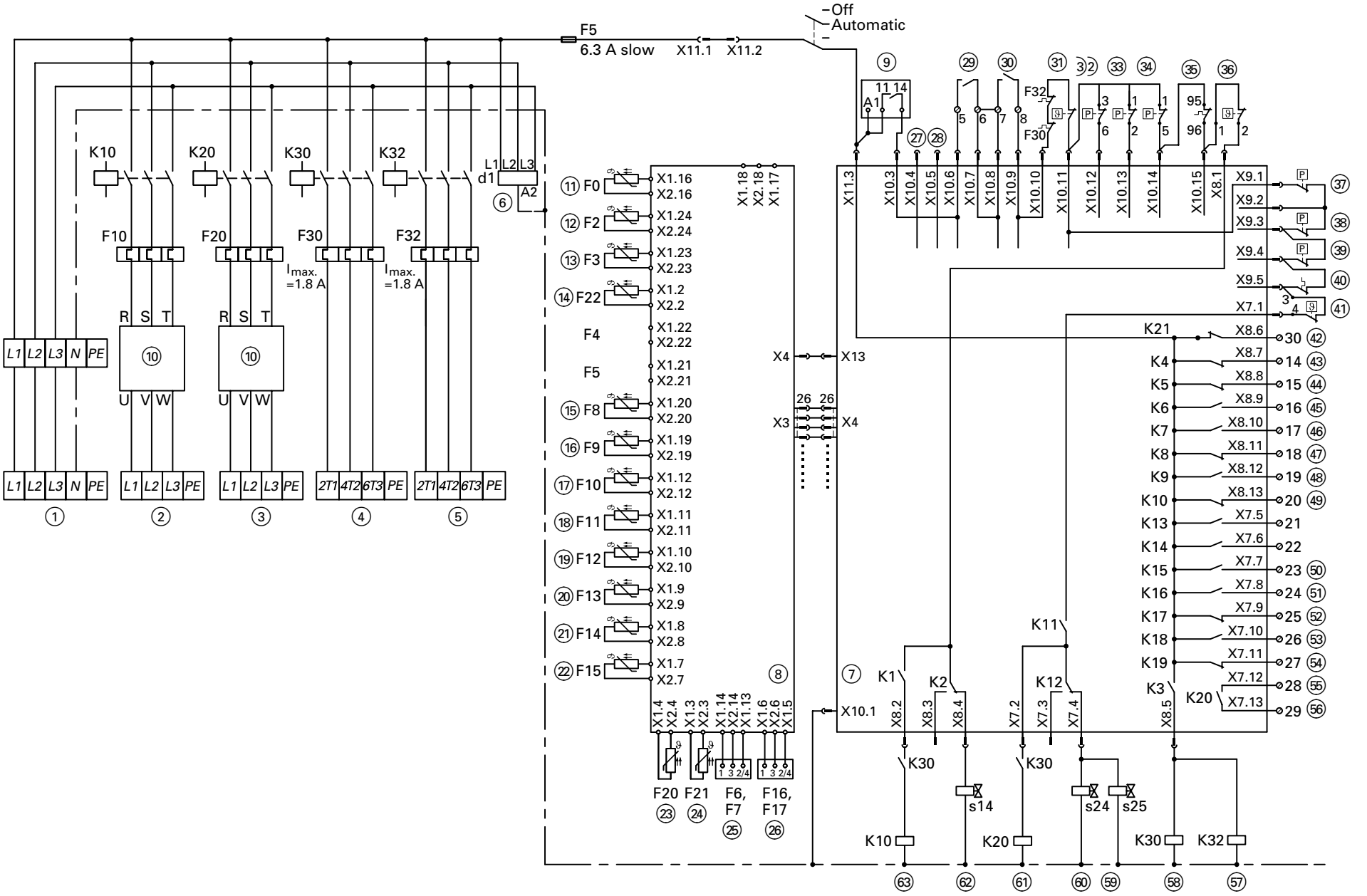
Vitocal 300, type WW



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Vitocal 300, type WW (cont.)

Connections 3/N/PE~400V

① Mains connection 3/N/PE~400V
② Compressor 1
③ Compressor 2
④ Primary pump (on site)
⑤ Intermediate circuit pump (accessory)
⑥ Phase failure relay (input)
⑦ Controller circuit board
⑧ Connection circuit board
⑨ Phase failure relay (switching contact)
⑩ Soft starter*1

Analogue inputs

⑪ Outside temperature sensor 1
⑫ Primary flow temperature sensor
⑬ Primary return temperature sensor
⑭ Swimming pool sensor
⑮ Flow temperature sensor
⑯ Return temperature sensor
⑰ Upper storage unit temperature sensor in heating water buffer storage unit 1
⑱ Lower storage unit temperature sensor in heating water buffer storage unit 1
⑲ Flow temperature sensor in the heating circuit 1 (accessory)
⑳ Flow temperature sensor in the heating circuit 2 (accessory)
㉑ Lower temperature sensor in DHW cylinder 1
㉒ Upper temperature sensor in DHW cylinder 2
㉓ Upper storage unit temperature sensor in heating water buffer storage unit 2
㉔ Lower storage unit temperature sensor in heating water buffer storage unit 2
㉕ Remote control 1 (accessory) incl. room temperature sensor 1
㉖ Remote control 2 (accessory) incl. room temperature sensor 2

Digital inputs

㉗ Remote selection of heat pump or EVU signal
㉘ Remote heat pump selection
㉙ Flow switch
㉚ E blocking
㉛ Thermal overload relay primary pump and thermal overload relay circulation pump for intermediate circuit
㉜ Safety HP compressor 1
㉝ LP compressor 1
㉞ Controlled HP compressor 1
㉟ Thermal overload relay – compressor stage 1
㊱ Frost protection thermostat – compressor 1*2
㊲ Safety HP compressor 2
㊳ LP compressor 2
㊴ Controlled HP compressor 2
㊵ Thermal overload relay – compressor stage 2
㊶ Frost protection thermostat – compressor 2*2

*1*Only for types 108, 110, 113, 116, 212, 216, 220, 226 and 232.*
*2*Remove jumper when making this connection.*

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Vitocal 300, type WW (cont.)

Outputs

(42) Solar heating circuit circulation pump
(43) Secondary pump
(44) Second heat source (heating water direct water heater)
(45) Mixer 1 OPEN
(46) Mixer 1 CLOSE
(47) Heating circuit pump 1
(48) Three-way changeover valve 1
(49) Immersion heater element
(50) Mixer 2 OPEN
(51) Mixer 2 CLOSE
(52) Heating circuit pump 2
(53) Three-way changeover valve 2
(54) Immersion heater element
(55) Central fault message, zero-volt
(56) Central fault message, zero-volt
(57) Circulation pump for intermediate circuit
(58) Primary pump
(59) Shut-off valve compressor 2
(60) Solenoid valve liquid gas compressor 2
(61) Compressor stage 2
(62) Solenoid valve liquid gas compressor 1
(63) Compressor stage 1

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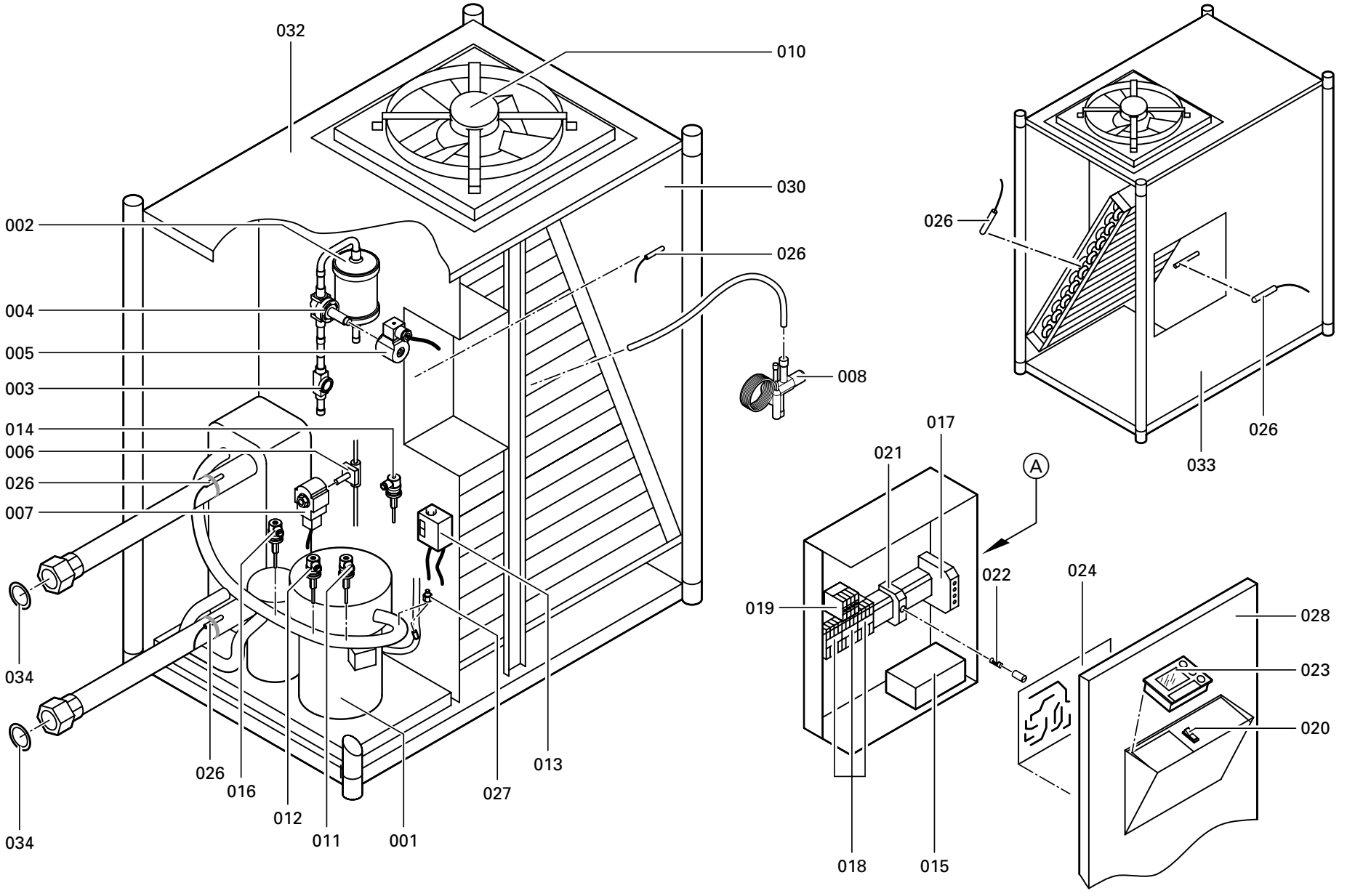
Vitocal 300, type AW



Vitocal 300, type AW (cont.)

When ordering spare parts:
Quote the type and serial no. (see type plate) and the item no. of the required part (as per parts list). Obtain common parts from your local supplier.

Parts
001 Compressor
002 Filter dryer
003 Sight glass
004 Body – solenoid valve
005 Solenoid coil for item 004
006 Hot gas solenoid valve
007 Solenoid coil for item 006
008 Expansion valve
010 Fan
011 Safety HP switch
012 Controlled HP switch
013 Hot gas thermostat
014 LP switch
015 Solid shaft soft starter
016 Defrost HP switch
017 Phase failure relay
018 Contactor K2
019 Thermal overload relay
020 Rocker switch, On/Off
021 Fuse holder
022 Fuse 6.3/250 V (slow)
023 Comfortrol control unit
024 Electronics board CD 60 control unit
026 Sensors
027 Cover incl. copper gasket
028 Door, heat pump
030 Side panel, r.h.
032 Top plate
033 Rear panel
034 Sealing washers 1"

Parts (not shown)
029 Door, r.h., heat pump
031 Side panel, l.h.
040 Operating instructions
042 Installation and service instructions
044 Touch-up paint stick, Vito silver
045 Touch-up spray, Vito silver
048 Outside temperature sensor

Ⓐ Type plate

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Vitocal 300, type BW and WW

When ordering spare parts:
Quote the type and serial no. (see type plate) and the item no. of the required part (as per parts list). Obtain common parts from your local supplier.

Parts
001 Compressor
002 Filter dryer
003 Sight glass
004 Body – solenoid valve
005 Solenoid coil for item 004
006 Expansion valve
008 Safety HP switch
009 Controlled HP switch
010 Three-way valve*1
011 LP switch
012 Solid shaft soft starter
014 Phase failure relay
015 Contactor K2
016 Aux. contact HN 10
017 Thermal overload relay (1.2 to 1.8 A)
018 Thermal overload relay
019 Rocker switch, On/Off
020 Fuse holder
021 Fuse 6.3/250 V (slow)
022 Comfortrol control unit
024 Electronics board CD 60 control unit
025 Sensors
026 Cover incl. copper gasket
027 Refrigeration module
050 Front panel
051 Side panel, r.h.
053 Sealing washer, 1"
054 Sealing washer, 1¼"
055 Sealing washer, 1½"
056 Hinged cover

*1 *Only for part nos. 3004 307 to 3004 312.*

Parts (not shown)
040 Operating instructions
042 Installation and service instructions
044 Touch-up paint stick, Vito silver
045 Touch-up spray, Vito silver
048 Outside temperature sensor
052 Side panel, l.h.

Ⓐ Type plate
Ⓑ Control unit for part nos. 3004 301 to 3004 306
Ⓒ Control unit for part nos. 3004 307 to 3004 312

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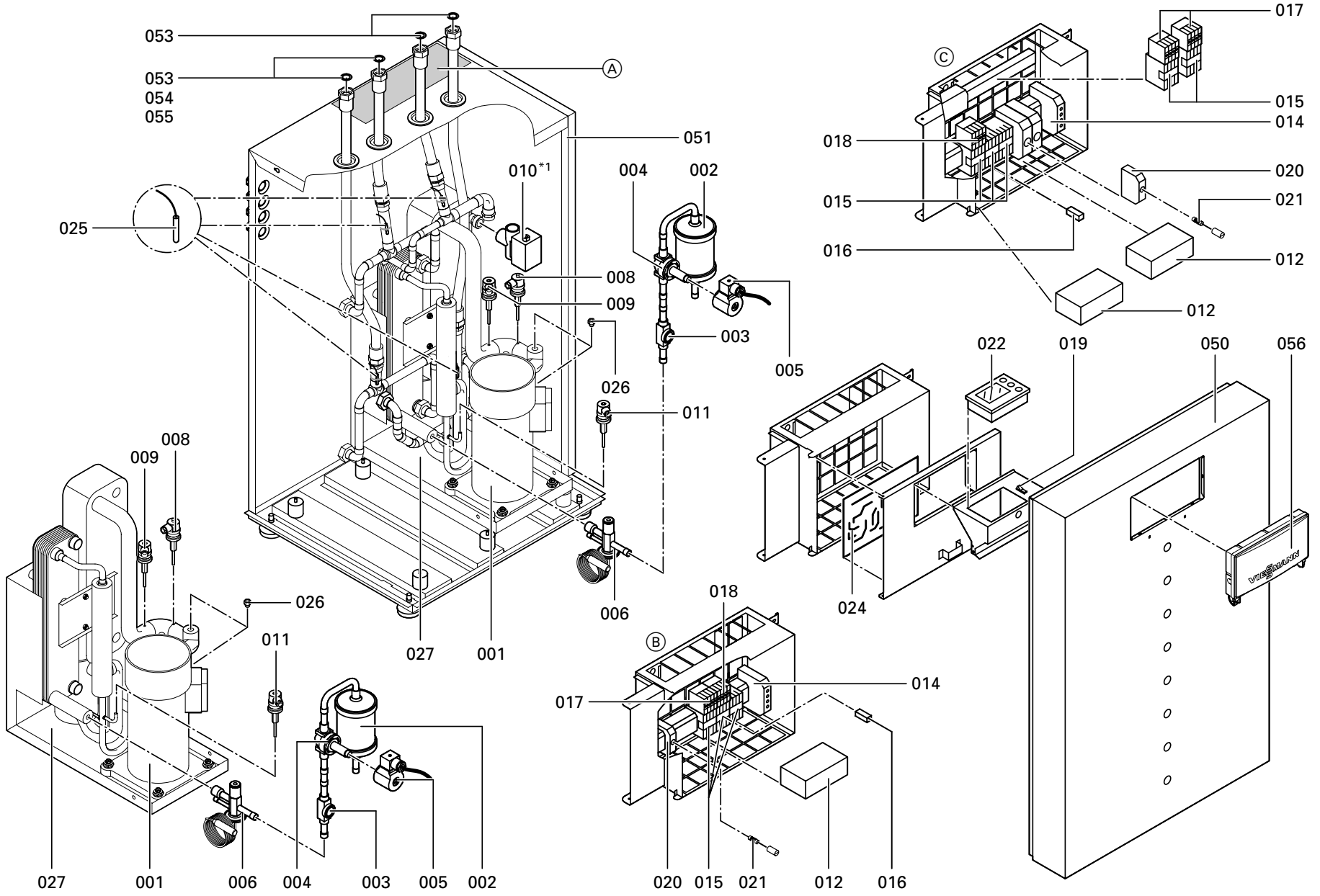
Vitocal 300, type BW and WW (cont.)



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Commissioning/service reports

Actual values		Commissioning:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Set value	
Anti-freeze concentration (brine medium)								-15 °C	
Heating circuit flow rate									
Heating flow temperature	°C							35 °C	35 °C
Heating return temperature	°C								
Temperature difference ΔT	K							8-12K	6-10K
Checked under the following conditions:									
Type of circulation pump									
Circulation pump stage									
Overflow valve setting									
Air flow rate (type AW)									
Ventilation air temperature	°C							Set values see page 120	
Exhaust air temperature	°C								
Temperature difference ΔT	K								
Checked under the following conditions:									
Heating flow temperature	°C								
Ambient temperature	°C								
Brine flow rate (type BW)									
Brine inlet temperature	°C							10 °C	0 °C
Brine outlet temperature	°C								
Temperature difference ΔT	K							3-5K	2-4K
Checked under the following conditions:									
Heating flow temperature	°C							35 °C	35 °C
Type of circulation pump									
Circulation pump stage									

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Commissioning/service reports (cont.)

Actual values		Commissioning:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Maintenance/ Service date: by:	Set value	
Groundwater flow rate (type WW)									
Water inlet temperature	°C							10 °C	
Water outlet temperature	°C								
Temperature difference ΔT	K							3-5K	
Checked under the following conditions:									
Heating flow temperature	°C							35 °C	
Type of circulation pump									
Circulation pump stage									
DHW heating									
Domestic hot water cylinder temperature	°C								
Heating flow temperature	°C								
Heating return temperature	°C								
Suction gas superheating									
Temperature	°C								
Condenser sludge level									
Compressor 1									
Pressure	°C								
Pressured gas temperature	°C								
Heating flow temperature	°C								
Compressor 2									
Pressure	°C								
Pressured gas temperature	°C								
Heating flow temperature	°C								

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Commissioning/service reports (cont.)

Only the parameters applicable to the individual system version will be displayed.

Setting parameters	Setting range:	Standard settings:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:
System parameters							
Date and time							
Summer/winter time limit	0 °C to +30 °C	18 °C					
Setting the party time	any time	no program					
Setting a holiday period	any period	no program					
Frost protection threshold	0 °C to +9 °C	4 °C					
Heat pump parameters							
Current operating mode	Standard / Off / Red / Fixed	Standard					
Standard temperature	(Tred + 0.1 °C) + 25 °C	20 °C					
Reduced temperature	10 - (Tstd - 0.1 °C)	16 °C					
Timer/time switch		Standard: 02.00 Reduced: 18.00					
Too cold/ too hot							
Selection of operating mode	Rot. sel. /rem.cont. / Off / Red. / Standard / Timer	Rotary selector					
Curve	S = 0 to 9; B0 = 25 °C to 80 °C	S = 0.6; B0 = 33 °C					
Additional sensor	None / 2x cylinder add / Room f / Remote contr.	None					
Max. room temperature deviation	0.5 °C to 3 °C	2 °C					
Fixed value regulator	Yes/No	Yes					
Fixed temperature	20 °C to (max. temp. -1 °C)	46 °C					
Control temperature max.	30 °C to 80 °C	48 °C					
Control hysteresis +/-	2 °C to 10 °C	3 °C					
Control tolerance	2 °C to 10 °C	2 °C					
Minimum operating time	5 min - (t_{max} - 1 min)	20 min					

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Commissioning/service reports (cont.)

Setting parameters	Setting range:	Standard settings:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:
Heat pump parameters (cont.)							
Max. operating time	10 min to 40 min	40 min					
min. comp. operating time	0 to 60 min	20 min					
Start delay	0 to 15 min	5 min					
Flow load pump	0 to 15 min	30 s					
Flow fan	0 to 15 min	30 s					
Final loading	0 to 240 min	0 min					
Number of satellites	0 / 1 / 2	0					
Hours run balancing	Yes/No	Yes					
Air defrosting	Yes/No	No					
Defrost temperature start	-5 °C to +5 °C	0 °C					
Defrost temperature end	5 °C to 20 °C	12 °C					
Maximum defrost time	0 to 60 min	20 min					
Max. time HP defrost	10 s to 2 min	2 min					
Minimum defrost pause	1 to 82 min	55 min					
Alternative	Yes/No	Yes					
Min. primary inlet temp.	-20 °C to +10 °C	-15 °C					
Start delay 2nd HS	0 to 480 min	30 min					
Restart hysteresis	1 to 10 °C	2 °C					
Start delay heat pump	0 to 120 min	30 min					
Minimum outside temperature	-10 °C to +20 °C	-5 °C					
Start temperature 2nd HS	-20 °C to +20 °C	0 °C					
E blocking	Yes/No	Yes					
Pump on at 2nd HS	Yes/No	Yes					
Regulated 2nd HS	Yes/No	Yes					
2nd output	Yes/No	No					

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Commissioning/service reports (cont.)

Setting parameters	Setting range:	Standard settings:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:
DHW cylinder parameters							
Current operating mode	On / Off	Off					
Selection of operating mode	Timer/ Off	Timer					
Additional sensor	none / F top	none					
DHW cylinder temperature	(T_{min} + 1 °C) to (T_{max} -1 °C)	45 °C					
DHW cylinder temperature maximum	(DHW cylinder temp. -1) to 99 °C	46 °C					
DHW cylinder temperature minimum	10 °C to (DHW cylinder temp. -1)	10 °C					
DHW cylinder hysteresis	3 °C to 30 °C	8 °C					
Timer/time switch		22.00 - 01.00					
DHW cylinder priority	Yes/No	Yes					
2nd HS	Yes/No	No					
2nd HS	50 °C to 99 °C	60 °C					

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Commissioning/service reports (cont.)

Setting parameters	Setting range:	Standard settings:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:	Actual values set date:
Mixer parameters							
Current operating mode	Standard / Reduced / Off	Standard					
Standard temperature	(Tred + 0.1 °C) + 25 °C	20 °C					
Reduced temperature	10 - (Tstd -0.1 °C)	16 °C					
Timer/time switch	Standard:04.00 Reduced: 20.00						
Too cold/ too hot							
Selection of operating mode	Rot sel. /rem.cont. / Off / Red. / Standard / Timer	Rotary selector					
Curve	S = 0 to 9; B0 = 25 °C to 80 °C	S = 1.0; B0 = 41 °C					
Additional sensor	None / 2x cylinder add / Room f / Remote contr.	None					
Max. return temperature deviation	0.5 °C to 3 °C	2 °C					
Fixed value regulator	Yes/No	No					
Fixed value temperature	20 °C to 120 °C	45 °C					
Load rise	Yes/No	Yes					
Load rise	-20 °C to +99 °C	2 °C					
Maximum flow temperature	30 °C to 99 °C	55 °C					
Active range	2 °C to 10 °C	4 °C					
Dead range +/-	0.5 °C to 3 °C	1 °C					
Period	5 s to 1 min	10 s					
DHW cylinder priority	On / Off / Reduced	Off					

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Specification

Type AW 106, 108, 110

Vitocal 300	Type	AW 106	AW 108	AW 110
Performance data				
Rated output	kW	5.4	7.2	9.3
Operating point A2/W35[*1] acc. to EN 255				
Refrigeration capacity	kW	3.70	4.95	6.50
Power consumption	kW	1.70	2.25	2.80
Performance factor ε (COP)		3.18	3.18	3.31
Heat recovery				
Fan rating	W	200	200	200
Air volume	m^3/h	3500	3500	3500
Max. permiss. pressure drop vent. & exhaust duct	Pa	30	30	30
Min. air temperature	°C	-15	-15	-15
Defrost rating	W	approx. 2100	approx. 2700	approx. 3300
Proportion defrost time/ operating time	%	7 to 17	7 to 17	7 to 17
Heating water (secondary)				
Contents	litres	1.6	2.2	2.7
Min. throughput[*2]	litres/h	550	700	950
Flow resistance	mbar	40	40	30
max. flow temperature	°C (A-15)	45	45	45
	°C (A-5)	55	55	55
Electrical values				
Heat pump				
Rated voltage		3/N/PE ~ 400 V 50 Hz		
Rated current (max.)	A	4.8	6.3	7.9
Start-up current	A	27	14[*3]	20[*3]
Start-up current (with stalled armature)	A	31.0	43.5	51.0
Fuse (slow)	A	3 x 10	3 x 16	
Protection		IP 20		
Control circuit				
Rated voltage		230 V ~ 50 Hz		
Fuse (internal)	A	6.3 A H slow		

*[*1]Operating point: A2 = Air inlet temp. = 2 °C / W35 = Heating water outlet temp. 35 °C.*
*[*2]Always safeguard the min. throughput.*
*[*3]Incl. start-up current limiter.*

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Specification (cont.) **Type AW 106, 108, 110**

Vitocal 300	Type	AW 106	AW 108	AW 110
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	3.4	3.7	4.2
Compressor	type	Hermetically sealed scroll compressor		
Dimensions				
Overall length	mm	877		
Overall width	mm	1200		
Overall height	mm	1510		
Max. operating pressure	bar	4		
Connections				
Heating flow and return	R (female)	1″		
Operating noise (free field 5 m)	dB	45		
Weight	kg	215	235	250

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Specification (cont.) **Type AW 113, 116**

Vitocal 300	Type	AW 113	AW 116
Performance data			
Rated output	kW	12.2	14.6
Operating point A2/W35*1 acc. to EN 255			
Refrigeration capacity	kW	8.40	10.00
Power consumption	kW	3.80	4.60
Performance factor ε (COP)		3.21	3.18
Heat recovery			
Fan rating	W	200	200
Air volume	m^3/h	3500	3500
max. permiss. pressure drop vent. & exhaust duct	Pa	30	30
Min. air temperature	°C	-15	-15
Defrost rating	W	approx. 4000	approx. 4800
Proportion defrost time/operating time	%	7 to 17	7 to 17
Heating water (secondary)			
Contents	litres	3.3	3.3
Min. throughput*2	litres/h	1200	1400
Flow resistance	mbar	40	60
Max. flow temperature	°C (A-15)	45	45
	°C (A-5)	55	55
Electrical values			
Heat pump			
Rated voltage		3/N/PE ~ 400 V 50 Hz	
Rated current (max.)	A	10.0	13.3
Start-up current	A	23*3	26*3
Start-up current (with stalled armature)	A	59.5	70.5
Fuse (slow)	A	3 x 16	3 x 20
Protection		IP 20	
Control circuit			
Rated voltage		230 V ~ 50 Hz	
Fuse (internal)	A	6.3 AH slow	

*1 *Operating point: A2 = Air inlet temp. = 2°C / W35 = Heating water outlet temp. 35°C.*
*2 *Always safeguard the min. throughput.*
*3 *Incl. start-up current limiter.*

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Specification (cont.) — Type AW 113, 116

Vitocal 300	Type	AW 113	AW 116
Refrigeration circuit			
Process medium		R 407C	
Fill volume	kg	4.4	4.8
Compressor	type	Hermetically sealed scroll compressor	
Dimensions			
Overall length	mm	877	
Overall width	mm	1200	
Overall height	mm	1510	
Max. operating pressure	bar	4	
Connections			
Heating flow and return	R (female)	1″	
Operating noise (free field 5 m)	dB	45	
Weight	kg	260	270

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Specification (cont.) — Type BW 104, 106, 108

Single stage	Type	BW 104	BW 106	BW 108
Rated output	kW	4.8	6.4	8.3
Operating point B0/W35*1				
Refrigeration capacity	kW	3.70	5.00	6.50
Power consumption	kW	1.10	1.40	1.80
Performance factor ε (COP)		4.36	4.57	4.61
Brine (primary)				
Contents	litres	1.7	2.3	2.8
Min. throughput*2	litres/h	1150	1600	2100
Flow resistance	mbar	90	90	90
Max. inlet temperature	°C	25	25	25
Min. inlet temperature	°C	–5	–5	–5
Heating water (secondary)				
Contents	litres	1.4	1.6	2.2
Min. throughput*2	litres/h	420	530	700
Flow resistance	mbar	40	40	40
Max. flow temperature	°C	55	55	55
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	3.9	4.8	6.6
Start-up current	A	19	27	14*3
Start-up current (with stalled armature)	A	22.0	31.0	43.5
Fuse (slow)	A	3 × 10		3 × 16
Protection		IP20		
Electrical values – control circuit				
Rated voltage		230 V~ 50 Hz		
Fuse (internal)	A	6.3 AH slow		
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	1.7	1.9	2.2
Compressor	Type	Hermetically sealed scroll compressor		
Max. permissible op. pressure				
Heating circuit (primary)	bar	4	4	4
Heating circuit (secondary)	bar	4	4	4

*1 *acc. to EN 255; B0 = brine inlet temp. = 0 °C/W35 = heating water outlet temp. 35 °C*
*2 *Always safeguard the min. throughput.*
*3 *Incl. start-up current limiter.*

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Specification (cont.) — Type BW 110, 113, 116

Single stage	Type	BW 110	BW 113	BW 116
Rated output	kW	10.8	14.0	16.3
Operating point B0/W35*1				
Refrigeration capacity	kW	8.40	11.00	12.70
Power consumption	kW	2.40	3.05	3.60
Performance factor ε (COP)		4.50	4.59	4.53
Brine (primary)				
Contents	litres	3.7	4.7	4.7
Min. throughput*2	litres/h	2700	3600	3900
Flow resistance	mbar	90	90	90
Max. inlet temperature	°C	25	25	25
Min. inlet temperature	°C	–5	–5	–5
Heating water (secondary)				
Contents	litres	2.7	3.3	3.3
Min. throughput*2	litres/h	950	1200	1400
Flow resistance	mbar	40	40	60
Max. flow temperature	°C	55	55	55
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	7.9	10.0	13.3
Start-up current	A	20*3	23*3	26*3
Start-up current (with stalled armature)	A	51.0	59.5	70.5
Fuse (slow)	A	3 × 16		3 × 20
Protection		IP20		
Electrical values – control circuit				
Rated voltage		230 V~ 50 Hz		
Fuse (internal)	A	6.3 AH slow		
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	2.6	3.1	3.4
Compressor	type	Hermetically sealed scroll compressor		
Max. permissible op. pressure				
Heating circuit (primary)	bar	4	4	4
Heating circuit (secondary)	bar	4	4	4

**1 acc. to EN 255; B0 = brine inlet temp. = 0 °C/W35 = heating water outlet temp. 35 °C*
**2 Always safeguard the min. throughput.*
**3 Incl. start-up current limiter.*

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Specification (cont.) — Type BW 208, 212, 216

Two-stage	Type	BW 208	BW 212	BW 216
Rated output	kW	9.6	12.8	16.6
Operating point B0/W35*1				
Refrigeration capacity	kW	7.40	10.00	13.00
Power consumption	kW	2.20	2.80	3.60
Performance factor ε (COP)		4.35	4.56	4.60
Brine (primary)				
Contents	litres	3.4	4.6	5.6
Min. throughput*2	litres/h	2300	3200	4200
Flow resistance	mbar	95	100	100
Max. inlet temperature	°C	25	25	25
Min. inlet temperature	°C	–5	–5	–5
Heating water (secondary)				
Contents	litres	2.8	3.2	4.4
Min. throughput*2	litres/h	840	1100	1400
Flow resistance	mbar	80	100	100
Max. flow temperature	°C	55	55	55
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	7.8	9.6	13.2
Start-up current (per compressor)	A	19	27	14*3
Start-up current (per compressor) (with stalled armature)	A	22.0	31.0	43.5
Fuse (slow)	A	3 × 16		3 × 20
Protection		IP20		
Electrical values – control circuit				
Rated voltage		230 V~ 50 Hz		
Fuse (internal)	A	6.3 AH slow		
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	2 × 1.7	2 × 1.9	2 × 2.2
Compressor	type	2 × Hermetically sealed scroll compressors		
Max. permissible op. pressure				
Heating circuit (primary)	bar	4	4	4
Heating circuit (secondary)	bar	4	4	4

*1 *acc. to EN 255; B0 = brine inlet temp. = 0 °C/W35 = heating water outlet temp. 35 °C*
*2 *Always safeguard the min. throughput.*
*3 *Incl. start-up current limiter.*

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Specification (cont.) — Type BW 220, 226, 232

Two-stage	Type	BW 220	BW 226	BW 232
Rated output	kW	21.6	28.0	32.6
Operating point B0/W35*1				
Refrigeration capacity	kW	16.80	22.00	25.40
Power consumption	kW	4.80	6.10	7.20
Performance factor ε (COP)		4.49	4.57	4.51
Brine (primary)				
Contents	litres	7.4	9.4	9.4
Min. throughput*2	litres/h	5400	7200	7800
Flow resistance	mbar	110	110	110
Max. inlet temperature	°C	25	25	25
Min. inlet temperature	°C	–5	–5	–5
Heating water (secondary)				
Contents	litres	5.4	6.6	6.6
Min. throughput*2	litres/h	1900	2400	2800
Flow resistance	mbar	100	100	100
Max. flow temperature	°C	55	55	55
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	15.8	20.0	26.6
Start-up current (per compressor)	A	20*3	23*3	26*3
Start-up current (per compressor) (with stalled armature)	A	51.0	59.5	70.5
Fuse (slow)	A	3 × 20	3 × 35	
Protection		IP20		
Electrical values – control circuit				
Rated voltage		230 V~ 50 Hz		
Fuse (internal)	A	6.3 AH slow		
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	2 × 2.6	2 × 3.1	2 × 3.4
Compressor	type	2 × Hermetically sealed scroll compressors		
Max. permissible op. pressure				
Heating circuit (primary)	bar	4	4	4
Heating circuit (secondary)	bar	4	4	4

*1 *acc. to EN 255; B0 = brine inlet temp. = 0 °C/W35 = heating water outlet temp. 35 °C*

*2 *Always safeguard the min. throughput.*

*3 *Incl. start-up current limiter.*

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Specification (cont.) — Type WW 104, 106, 108

Single stage	Type	WW 104	WW 106	WW 108
Rated output	kW	6.3	8.4	10.9
Operating point W10/W35[*1]				
Refrigeration capacity	kW	5.15	6.90	9.00
Power consumption	kW	1.15	1.50	1.90
Performance factor ε (COP)		5.48	5.60	5.74
Heating water (secondary)				
Contents	litres	1.4	1.6	2.2
Min. throughput[*2]	litres/h	440	580	730
Flow resistance	mbar	45	45	45
Max. flow temperature	°C	55	55	55
Groundwater (primary)				
Contents	litres	1.7	2.3	2.8
Min. throughput[*2]	litres/h	1150	1600	2100
Flow resistance	mbar	90	90	90
Max. inlet temperature	°C	25	25	25
Min. inlet temperature for				
■ standard groundwater volume	°C	7.5	7.5	7.5
■ groundwater volume 40 % greater	°C	6.5	6.5	6.5
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	3.9	4.8	6.6
Start-up current	A	19	27	14[*3]
Start-up current (with stalled armature)	A	22.0	31.0	43.5
Fuse (slow)	A	3 × 10		3 × 16
Protection		IP20		
Electrical values – control circuit				
Rated voltage		230 V~ 50 Hz		
Fuse (internal)	A	6.3 AH slow		
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	1.7	1.9	2.2
Compressor	type	Hermetically sealed scroll compressor		
Max. permissible op. pressure				
Groundwater circuit (primary)	bar	4	4	4
Heating water circuit (secondary)	bar	4	4	4
Intermediate circuit	bar	4	4	4

*[*1] acc. to EN 255; W10 = groundwater inlet temp. = 10 °C/W35 = heating water outlet temp. 35 °C*
*[*2] Always safeguard the min. throughput.*
*[*3] Incl. start-up current limiter.*

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Specification (cont.) — Type WW 110, 113, 116

Single stage	Type	WW 110	WW 113	WW 116
Rated output	kW	14.2	18.3	21.5
Operating point W10/W35[*1]				
Refrigeration capacity	kW	11.70	15.20	17.80
Power consumption	kW	2.50	3.10	3.70
Performance factor ε (COP)		5.68	5.90	5.81
Heating water (secondary)				
Contents	litres	2.7	3.3	3.3
Min. throughput[*2]	litres/h	1000	1250	1500
Flow resistance	mbar	45	40	60
Max. flow temperature	°C	55	55	55
Groundwater (primary)				
Contents	litres	3.7	4.7	4.7
Min. throughput[*2]	litres/h	2700	2700	3900
Flow resistance	mbar	90	90	105
Max. inlet temperature	°C	25	25	25
Min. inlet temperature for				
■ standard groundwater volume	°C	7.5	7.5	7.5
■ groundwater volume 40 % greater	°C	6.5	6.5	6.5
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	7.9	10.0	13.3
Start-up current	A	20[*3]	23[*3]	26[*3]
Start-up current (with stalled armature)	A	51.0	59.5	70.5
Fuse (slow)	A	3 × 16		3 × 20
Protection		IP20		
Electrical values – control circuit				
Rated voltage		230 V~ 50 Hz		
Fuse (internal)	A	6.3 AH slow		
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	2.6	3.1	3.4
Compressor	type	Hermetically sealed scroll compressor		
Max. permissible op. pressure				
Groundwater circuit (primary)	bar	4	4	4
Heating water circuit (secondary)	bar	4	4	4
Intermediate circuit	bar	4	4	4

*[*1] acc. to EN 255; W10 = groundwater inlet temp. = 10 °C/W35 = heating water outlet temp. 35 °C*

*[*2] Always safeguard the min. throughput.*

*[*3] Incl. start-up current limiter.*

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Specification (cont.) — Type WW 208, 212, 216

Two-stage	Type	WW 208	WW 212	WW 216
Rated output	kW	12.6	16.8	21.8
Operating point W10/W35[*1]				
Refrigeration capacity	kW	10.30	13.80	18.00
Power consumption	kW	2.30	3.00	3.80
Performance factor ε (COP)		5.46	5.58	5.72
Heating water (secondary)				
Contents	litres	2.8	3.2	4.4
Min. heating water throughput[*2]	litres/h	880	1160	1460
Condenser pressure loss	mbar	80	105	105
Max. flow temperature	°C	55	55	55
Groundwater (primary)				
Contents	litres	3.4	4.6	5.6
Min. groundwater throughput[*2]	litres/h	2300	3200	4200
Evaporator pressure loss	mbar	95	100	100
Max. inlet temperature	°C	25	25	25
Min. inlet temperature for				
■ standard groundwater volume	°C	7.5	7.5	7.5
■ groundwater vol. 40 % greater	°C	6.5	6.5	6.5
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	7.8	9.6	13.2
Start-up current (per compressor)	A	19	27	14[*3]
Start-up current (per compressor) (with stalled armature)	A	22.0	31.0	43.5
Fuse (slow)	A	3 × 16		3 × 20
Protection		IP20		
Electrical values – control circuit				
Rated voltage		230 V~ 50 Hz		
Fuse (internal)	A	6.3 AH slow		
Refrigeration circuit				
Process medium		R 407C		
Fill volume	kg	2 × 1.7	2 × 1.9	2 × 2.2
Compressor	type	2 × Hermetically sealed scroll compressors		
Max. permissible op. pressure				
Groundwater circuit (primary)	bar	4	4	4
Heating water circuit (secondary)	bar	4	4	4
Intermediate circuit	bar	4	4	4

*[*1] acc. to EN 255; W10 = groundwater inlet temp. = 10°C/W35 = heating water outlet temp. 35°C*
*[*2] Always safeguard the min. throughput.*
*[*3] Incl. start-up current limiter.*

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Specification (cont.) — Type WW 220, 226, 232

Two-stage	Type	WW 220	WW 226	WW 232
Rated output	kW	28.4	36.6	43.0
Operating point W10/W35*1				
Refrigeration capacity	kW	23.40	30.40	35.60
Power consumption	kW	5.00	6.20	7.40
Performance factor ε (COP)		5.66	5.87	5.79
Heating water (secondary)				
Contents	litres	5.4	6.6	6.6
Min. heating water throughput*2	litres/h	2000	2500	3000
Condenser pressure loss	mbar	110	110	110
Max. flow temperature	°C	55	55	55
Groundwater (primary)				
Contents	litres	7.4	9.4	9.4
Min. groundwater throughput*2	litres/h	5400	7200	7800
Evaporator pressure loss	mbar	110	120	120
Max. inlet temperature	°C	25	25	25
Min. inlet temperature for				
■ standard groundwater volume	°C	7.5	7.5	7.5
■ groundwater vol. 40 % greater	°C	6.5	6.5	6.5
Electrical values – heat pump				
Rated voltage		3/N/PE~ 400 V/50 Hz		
Rated current (max.)	A	15.8	20.0	26.6
Start-up current (per compressor)	A	20*3	23*3	26*3
Start-up current (per compressor) (with stalled armature)	A	51.0	59.5	70.5
Fuse (slow)	A	3 × 20	3 × 35	3 × 35
Protection			IP20	
Electrical values – control circuit				
Rated voltage			230 V~ 50 Hz	
Fuse (internal)	A		6.3 AH slow	
Refrigeration circuit				
Process medium			R 407C	
Fill volume	kg	2 × 2.6	2 × 3.1	2 × 3.4
Compressor	type	2 × Hermetically sealed scroll compressors		
Max. permissible op. pressure				
Groundwater circuit (primary)	bar	4	4	4
Heating water circuit (secondary)	bar	4	4	4
Intermediate circuit	bar	4	4	4

**1 acc. to EN 255; W 10 = groundwater inlet temp. = 10 °C/W 35 = heating water outlet temp. 35 °C*
**2 Always safeguard the min. throughput.*
**3 Incl. start-up current limiter.*

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Certificate of conformity for heat pumps

We, Viessmann Werke GmbH & Co, D-35107 Allendorf, declare, as sole responsible body, that the products

Vitocal 300, type AW and BW incl. CD60 heat pump control unit

conform to the following standards:
EN 292/T1/T2
EN 294
EN 349
EN 378
EN 55 014
EN 55 104
EN 60 335/T1/T40
EN 60 529
DIN 7003
DIN 8901
DIN 8975
VGB 20
DruckbehV

This product is identified in accordance with the following guidelines:
89/392/EEC
89/336/EEC
73/ 23/EEC

as follows:

CE

Allendorf, the 1st. March 2002

Viessmann Werke GmbH & Co
pp.

Prof. Dr.-Ing. Helmut Burger

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